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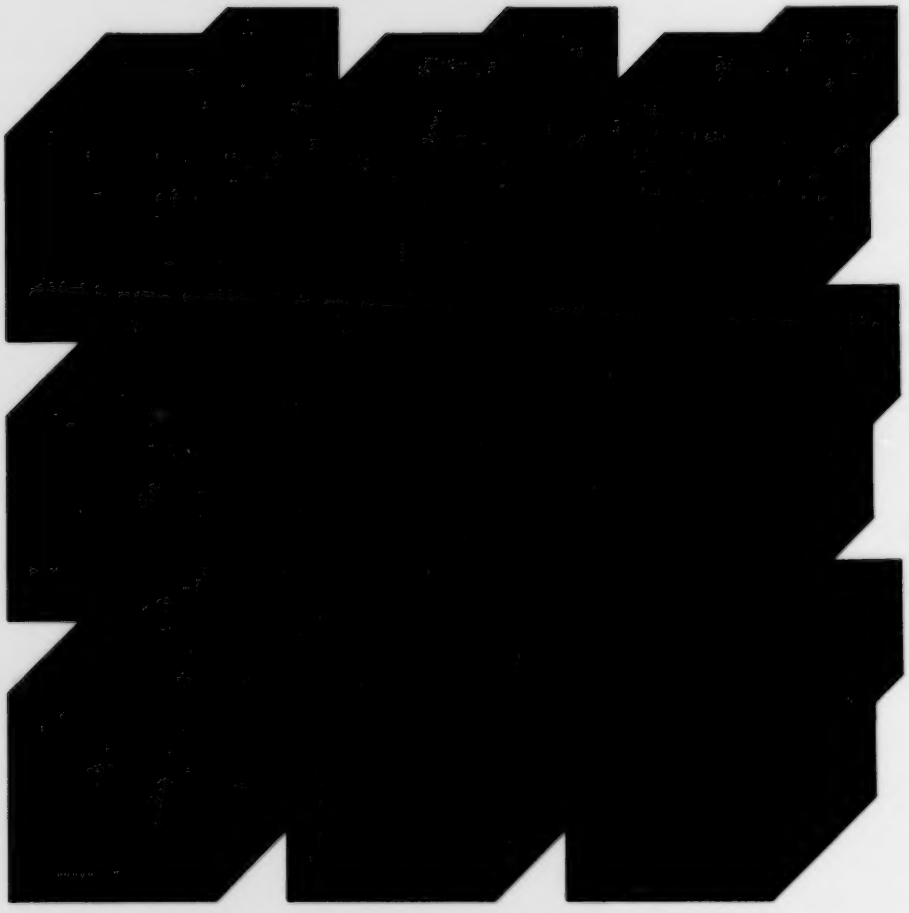

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DISCUSSION PAPER NO. 351

An Economic Analysis of the Shipbuilding Industry Assistance Program

by

K. E. A. de Silva

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RÉSUMÉ

Dans une économie de marché, l'adaptation est le processus par lequel les facteurs de production sont affectés à leur usage le plus productif. Bien que l'adaptation soit un processus continu, elle ne procède pas toujours au même rythme. Les chocs qui viennent perturber le système économique, tels que les changements dans la technologie de production, le prix des facteurs et la politique publique, rendent quelquefois difficile pour certaines industries de s'adapter rapidement au nouvel environnement économique. Parfois, les pressions exercées en vue du changement sont si fortes que l'État intervient par des politiques visant à aider les industries d'un secteur particulier à s'adapter au changement.

La construction navale est un bon exemple d'une industrie qui a bénéficié d'une politique sectorielle d'aide à l'adaptation. Cette industrie est l'une des plus faibles de l'économie canadienne, et elle a connu une réduction de sa production et de l'emploi au cours de la période de 1961 à 1984, surtout durant les années 80. La croissance de la productivité y a été particulièrement faible. Si la performance de cette industrie est aussi peu reluisante, c'est qu'elle n'est pas concurrentielle à l'échelle internationale. À cause du niveau élevé des salaires et de sa faible productivité, le Canada n'a pas été en mesure de soutenir la concurrence de pays tels que le Japon et la Corée du Sud. Le problème a été aggravé par la baisse de la demande mondiale perceptible depuis le milieu jusqu'à la fin des années 70, mais devenue plus marquée durant les années 80. En raison des sombres perspectives auxquelles l'industrie est confrontée, plusieurs pays ont encouragé une réduction de la capacité de production. Le Canada, par contre, a continué à subventionner cette industrie sous une forme ou une autre.

L'histoire des subventions à la construction navale au Canada remonte jusqu'en 1961. Avant 1975, on pouvait distinguer deux genres de programmes de subventions : les premiers étaient destinés à aider la construction navale pour les usagers canadiens, et les autres visaient à encourager l'exportation. Le Programme d'aide aux constructeurs de navires (PACN) réunissait ces deux éléments sous une même politique générale. Il a duré de 1975 à 1985, période durant laquelle environ 480 millions de dollars (courants) ont été versés en subventions. Les objectifs du PACN étaient de promouvoir la compétitivité internationale de l'industrie, d'assurer la stabilité de l'emploi et de rendre graduellement l'industrie moins dépendante de l'aide publique.

Dans la présente étude, l'auteur examine l'efficacité du PACN. Les données disponibles démontrent qu'aucun des objectifs du programme n'a été atteint. Elles révèlent en outre qu'une part considérable des fonds versés en vertu du programme est allée à des chantiers maritimes qui, depuis lors, ont cessé leurs

activités ou ont périclité. Une des principales raisons de l'insuccès du PACN a été l'absence d'une raison d'être valable. Un programme tel que le PACN serait justifié s'il existait une imperfection du marché empêchant l'industrie de progresser. Mais il ne semble pas que ce fut le cas de l'industrie de la construction navale. De plus, avant de verser des subventions, le gouvernement aurait dû tenter d'en mesurer l'efficacité au regard des coûts. Malheureusement, rien dans l'information publiée n'indique qu'une telle tentative ait été faite. On n'a pas tenu compte non plus du principe de l'augmentation dans l'application du programme, de sorte que les administrateurs ont fini par subventionner tous les projets qui faisaient l'objet d'une demande d'aide, au lieu de subventionner seulement ceux qui n'auraient pas été entrepris sans la subvention.

En somme, la principale conclusion de l'étude est que le PACN a été un fiasco. La fin du PACN n'a cependant pas marqué la fin des subventions à la construction navale. Celles-ci ont continué, en particulier sous la forme de politiques d'achat. La principale leçon à retenir de l'expérience du PACN est que les politiques d'aide à une entreprise ou à une industrie particulière ne constituent pas un moyen très efficace de promouvoir l'adaptation à un nouvel environnement économique.

ABSTRACT

In a market economy adjustment is the process whereby factors of production are allocated to their most productive use. Though adjustment is an ongoing process, it does not proceed at an even pace. Shocks to the economic system including changes in the production technology, input prices, and government policy may make it difficult for some industries to adjust rapidly to the new economic environment. In some instances, the pressures for change may be so great that the government intervenes with sector-specific policies designed to assist the industries to cope with change.

The shipbuilding industry is a prime example of an industry which has benefitted from a sector-specific adjustment policy. The industry is one of the weakest in the Canadian economy and has experienced a decline in output and employment during the 1961-84 period, particularly during the 1980s. There has also been very little growth in productivity. One reason for the industry's poor performance is its lack of international competitiveness. Because of high wages and low productivity, Canada has not been able to compete with such countries as Japan and South Korea. Compounding the problem is a decline in world demand which started during the mid to late 1970s but gathered momentum during the 1980s. Because of the dismal prospects facing the industry, several countries have encouraged a contraction of capacity. Canada, on the other hand, has continued to subsidize the industry in one form or another.

Subsidies to shipbuilding in Canada have a long history dating back to 1961. Prior to 1975 there were two types of subsidy programs - one to assist shipbuilding for domestic users, and the other to encourage exports. The Shipbuilding Industry Assistance Program (SIAP) integrated these two elements under a single policy umbrella. The program lasted from 1975 to 1985, during which period approximately $480 million (current dollars) was spent in subsidies. The objectives of SIAP were to promote the international competitiveness of the industry, maintain stable employment, and gradually reduce the dependence of the industry on government assistance.

The present study is an attempt to examine the effectiveness of the SIAP. The evidence shows that the program was not able to meet any of its objectives. The evidence also reveals that a considerable portion of the funds spent under the program went to shipyards which subsequently have either ceased to operate or been on the verge of bankruptcy. One of the major reasons for the failure of the SIAP was the lack of a valid rationale. A subsidy

program such as the SIAP would be justified if there is some market imperfection impeding the growth of the industry. But that does not seem to have been the case with the shipbuilding industry. Moreover, before assistance was given, the government should have tried to measure the cost effectiveness of the subsidy. Unfortunately, there is no published information to indicate that such an attempt was made. SIAP also failed to take into account the principle of incrementality. As a result, the program administrators ended up subsidizing all of the projects which applied for assistance instead of only those which would not have been undertaken without the subsidy.

On balance, then, the main conclusion of the study is that SIAP was a failure. The termination of the SIAP did not mark the end of subsidies to shipbuilding. Subsidization has continued, especially in the form of procurement policy. The main lesson to be learnt from the experience with the SIAP is that firm- and industry-specific policies are not a very effective way of promoting economic adjustment.

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FOREWORD

Despite the considerable degree of adjustment to change continuously taking place in the Canadian economy, both the federal and the provincial governments tend to intervene from time to time to alleviate the adjustment problems experienced by specific regions, industries and/or workers. Intervention in these instances usually takes the form of sector-specific programs.

In the course of the research undertaken for the Council's Manufacturing Firm Adjustment project, an attempt was made to examine the efficacy of some of the sector-specific policies introduced to reduce pressures of change in certain trade-sensitive industries. One such example is the Shipbuilding Industry Assistance program which is the subject of the present study. The program which was administered by the Department of Regional Industrial Expansion was designed to promote the international competitiveness of the industry, maintain stable employment and to make the industry more self-reliant over the longer term. The main conclusion of this study is that none of these objectives was achieved. Output and employment declined during the period of the program. And instead of reducing assistance, the government has continued to channel funds into the industry even after the program was terminated. The evidence reveals that the program lacked a valid rationale and that there was no significant increase in output and productivity directly attributable to the subsidy. The study examines in detail the factors that may have contributed to the failure of the program.

The author, K. E.A. de Silva, is a senior researcher on the Council's staff.

Judith Maxwell
Chairman

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1 INTRODUCTION

The shipbuilding industry is one of the weakest industries in the Canadian economy. During the period 1970-85, output and employment in the shipbuilding industry declined by 2.5 and 2.1 per cent per year respectively, whereas in manufacturing they increased by 2.5 and 0.7 per cent per year respectively. The decline was particularly severe during the 1980-85 period when output and employment fell by 10 and 7 per cent per year respectively. Productivity in shipbuilding has also declined. During 1970-85, annual productivity growth in shipbuilding, measured in terms of output per person employed fell by 0.4 per cent, compared with an increase of 1.8 per cent for manufacturing.

The problems experienced in the industry are not unique to Canada but are a global phenomenon. They are mainly due to the decline in the demand for vessel construction and to the energy price increases which occurred during the 1970s. In addition to these problems, the Canadian shipbuilding industry has also suffered from a lack of international competitiveness. This, in turn, has been partly due higher wages in Canada relative to her competitors such as Japan and the NICs, and partly due to lower productivity compared with some of her competitors. As a result, Canadian bids for vessel construction during the 1980s have exceeded the lowest bid by as much as 50 to 77 per cent in certain instances.

The Canadian government responded to the problems of the shipbuilding industry by providing assistance. The industry has received direct subsidies from 1961 to 1985. Before 1975, there were two types of subsidy programs. One was aimed at subsidizing ships constructed for domestic shipowners. The other was a subsidy designed to encourage exports. In 1975, these two programs were incorporated into a single program called the Shipbuilding Industry Assistance Program (SIAP), which lasted until 1985. Other forms of assistance to the industry have included export financing under the Export Development Corporation, tax incentives, and procurement policy. Of these, the last mentioned policy has become the principal form of assistance during the 1980s.

This study deals with the efficaciousness of SIAP. It forms part of a broader study dealing with firm adaptation to trade pressures and opportunities in the manufacturing sector. Shipbuilding is one of the few industries which received a specific adjustment assistance program.[1] The objectives of SIAP

were to promote the international competitiveness of the industry, maintain stable employment, and reduce the reliance of the industry on government assistance over time.

This study tries to examine whether the program was able to achieve its objectives and the extent of its success. Another objective of the present study is to consider whether government should intervene at all, and if so, how its policies could be improved in order to assist adaptation and to promote productivity growth. These issues are of great current interest given the concerns over possible adjustment problems because of the Canada-U.S. free-trade agreement. There is an additional reason why the present study would merit attention. We have not come across any published analysis of the impact of SIAP on the shipbuilding industry except for a background paper released by ITC/DREE during the early 1980s.[2] In fact, studies on Canadian shipbuilding are rare. Hence, there is a void in our knowledge which the present study hopefully will be able to fill.

The study is organized along the following lines. Chapter 2 provides an analysis of the performance of the industry during the 1962-85 period. Chapter 3 deals with the evolution of direct subsidy programs in shipbuilding. Chapter 4 presents an evaluation of SIAP. Chapter 5 summarizes the main findings of the study.

NOTES

1 For more details on the other industries which benefitted from industry-specific adjustment assistance programs, see Canada Department of Regional Industrial Expansion, "Canada's industrial adjustment: Federal government policies and programs" in John Whalley, Domestic Policies and the International Economic Environment, vol. 12, Royal Commission on the Economic Union and the Development Prospects for Canada (Ottawa: Minister of Supply and Services Canada, 1985), pp. 215-242.

2 The Honourable Edward Lumley, Minister of Industry, Trade and Commerce/Regional Economic Expansion, background paper Canada's Shipbuilding Industry Performance, Prospects and Policy Options (Ottawa: ITC/DREE, 1982).

2 SHIPBUILDING INDUSTRY OVERVIEW

The shipbuilding and repair industry (S.I.C. 3271) is a sub-group within the broad category of transportation equipment industry (S.I.C. 32). In 1984, the most recent year for which the data are available, shipbuilding accounted for about 2 per cent of the output of the transportation equipment industry and ranked seventh in terms of its contribution (Table 2-1).

The shipbuilding and repair industry includes establishments primarily engaged in the manufacturing and repairing of all types of ships of more than 5 tons displacement. Establishments primarily engaged in manufacturing ships of 5 tons or less displacement are classified under boatbuilding and repair industry (S.I.C. 3281). In 1984, there were 55 establishments or shipyards. They are mainly located in the Maritimes, British Columbia, Quebec, and Ontario (Table 2-2). Note, however, that the current number of shipyards is considerably lower than that which existed in the 1960s and 1970s. In 1961, for example, there were 63 shipyards and in 1979, there were 71.

The types of vessels built in Canada include fishing vessels, ferries, tugs and barges, government vessels, and offshore supply vessels. According to a recent study,[1] the maximum tonnage that can be built in Canada is around 80,000 deadweight tons, which implies that Canadian shipyards do not have the capability to build such vessels as liquid natural gas (LNG) carriers or ice-breaking tankers.

The shipbuilding industry plays a relatively minor role in the Canadian economy, judging from its contribution to real output, employment, and exports (Table 2-3). Its contribution to the manufacturing sector is also relatively small. Because of its geographical location, one should also consider the role of the industry in provincial economies. One way of doing this is by considering the impact of the industry on provincial employment. The data on this, which is available for only three provinces - Quebec, Ontario, and British Columbia - shows that the contribution of the industry to provincial employment is relatively insignificant. The highest is in British Columbia, where shipbuilding accounted for 1.83 per cent of provincial employment in 1984; in Quebec, it was 0.75 per cent, and in Ontario, only 0.21 per cent.[2] Due to reasons of confidentiality, no data are available for the Atlantic provinces. The industry is also a source of employment to certain local communities although its significance cannot be established with any precision.

At present, the industry is not export-oriented to any significant extent. In 1979, 45.2 per cent of the gross tonnage built in Canada was exported. But by 1983 the share of exports had declined to 9.8 per cent. Since 1984, exports have ceased

altogether. Imports, measured by gross tonnage of foreign built vessels in Canada have fluctuated considerably (Table 2-4). As a percentage of the gross tonnage of vessels built in Canada, imports increased from 37.4 per cent in 1979 to a phenomenal 471.1 per cent in 1984. Since then, the ratio of imports to gross tonnage domestically built has been less than 20 per cent.

The performance of the shipbuilding industry since the 1960s has been generally weak relative to the manufacturing sector. Whereas manufacturing output, measured in terms of real value added (RDP), grew at annual rates of 7 and 4 per cent during the 1960s and 1970s, shipbuilding output (also measured in terms of RDP) increased by only 1.4 and 2.0 per cent respectively during the same time periods (Table 2-5). During the 1980-85 period, there was a sharp deceleration in output growth in both sectors, but it was much more severe in shipbuilding, where output declined at an average annual rate of 10 per cent. For the 1962-85 period as a whole, output growth in shipbuilding was -0.06 per cent per year, compared with 4.3 per cent for manufacturing. Employment growth in the shipbuilding industry during the period 1962-85 was also -1.01 per cent per year, compared with 1.52 per cent per year in manufacturing. The dismal performance of the shipbuilding industry was also reflected in its productivity. Growth in output per person increased by only 0.95 per cent per year during 1962-85, compared with an annual increase of 2.75 per cent in manufacturing. For the period 1970-85, annual productivity growth in shipbuilding was a negative 0.4 per cent, compared with 1.80 per cent in manufacturing. Thus a preliminary look at some of the variables seems to suggest that shipbuilding is one of the declining industries in the Canadian economy.

Table 2-6 presents a breakdown of shipbuilding production into new construction and repairs and conversions, all expressed in constant (1971) dollars. Because the data on the implicit price deflator is available only up to 1983, it was not possible to obtain estimates on real output growth for the more recent years. It should also be pointed out that, unlike the RDP data reported in Table 2-6 which is based on real value added, the production data given in Table 2-7 refers to real gross output. Real output growth, measured in terms of gross output, has experienced a steady decline during the 1970s and 1980s, which was mainly due to a slowdown in real new construction. During the early 1970s, about three-quarters of real production consisted of real new construction. But by 1983, real new construction accounted for about three-fifths of real production. Since then, there seems to have been a further decline in the share of new construction in total output, judging by the data, in current dollars. Repairs and conversions also experienced a slowdown since the mid-1970s, but it was much less than in the case of new construction. Thus, it seems that the slowdown in shipbuilding activity would have been considerably greater if not for repairs and conversions. A similar trend can be observed in the United States (Table 2-7).

The slowdown has affected the construction of virtually all vessel types (Table 2-8). The worst affected were the tankers which, in 1975, accounted for almost one-half of the gross tonnage delivered by the shipyards; by 1986, their construction had come to a complete halt. The decline in tanker construction is mainly due to the increase in oil prices during the 1970s, since tankers are the principal mode of transportation of oil. Tugs, barges, and bulk carriers have also experienced sharp declines in construction. Since these vessels are used for the transportation of such commodities as coal, iron ore, forest products, and wheat, the decline in the construction of these vessels can be attributed to slower growth in demand for many of these natural resource products.[3] The only two major vessel categories to experience an increase in construction are ferries and government vessels. Ferries on the West and Atlantic coasts are owned by two crown corporations, B.C. Ferries and Marine Atlantic. The increase in ferry construction is due to the heavy emphasis on Canadian content in procurement policy. Precisely the same explanation holds true for government vessels. The dominance of government orders is even more pronounced than that shown in Table 2-8 if we consider vessels under construction or on order. In 1973, the earliest year for which the data are available, government vessels accounted for only 2.4 per cent of the gross tonnage of all vessels on order or under construction; by 1986, their share had risen to 95.9 per cent (Table 2-9). In addition to ferries and government vessels, an increase is also noticeable in offshore supply vessels and other structures. But this is not an area in which Canadian shipyards have played a dominant role. No offshore drilling rigs have been built in Canada after 1983. As for offshore supply vessels, they accounted for only 5.4 per cent of total gross tonnage when their production reached its peak in 1980. Since then, their production has been relatively small.

In a global context, Canada is not, and has never been, a major producer of ships. In 1965, Canada produced 1.5 per cent of the world gross tonnage of vessels launched but by 1984, it had dropped to 0.3 per cent (Table 2-10). The table also shows how comparative advantage in shipbuilding has shifted from Europe to Japan and, more recently, to the NICs, particularly South Korea, due to the lower unit costs of production in the latter countries. This point will be discussed in a later section. In 1975, Japan accounted for about half of the world's gross tonnage launched, while South Korea accounted for 1 per cent. By 1984, Japan's gross tonnage actually had declined, although it still accounted for about half of the world's gross tonnage. In contrast, South Korea's share not only increased to 14 per cent of the world total, its actual production increased six times between 1975 and 1984.

Table 2-10 also shows the sharp deterioration in world shipbuilding since the late 1970s. A major factor contributing to this decline was the slowdown in demand for vessels which,

according to the World Order Book, has continued into the 1980s and has become progressively worse (Table 2-11). The decline in demand which has affected all vessel types (Table 2-12) was largely a reflection of a slowdown in world shipping. After experiencing rapid growth during the 1950s and the 1960s, world shipping increased at a much slower rate during the 1970s, culminating in an actual decline (Table 2-13). One reason for the slower growth in shipping during the 1970s and 1980s is the sluggishness of the world economy. For example, growth in industrial labour productivity in the world economy increased by 4.5 per cent per year during 1960-73, but dropped to 2.6 per cent per year during 1973-82. Another reason is the oil price shocks during the 1970s, which led to energy conservation and exploration, and to a reduction in trade in oil. As a result of the decline in demand for vessel construction, world shipbuilding experienced considerable excess capacity. Although the statistical evidence is fragmentary, it seems that excess capacity was about 11 per cent[4] in 1975, but increased to 40 per cent[5] by 1985, despite some scrappage of capacity by shipbuilders. In the United States alone, capacity utilization has declined from 95.7 per cent in 1979 to 8.9 per cent in 1984.[6]

TECHNICAL CHARACTERISTICS OF PRODUCTION

A shipyard is essentially an assembly plant geared to the assembling of structural steel units. Yet it has an important subsidiary manufacturing role, which involves cutting, shaping and fabricating sheet and plate steel and pipe in conformity with the specifications of ship design. Sophisticated shipyards may also undertake the manufacture of propulsion machinery, but to all intents and purposes, shipbuilding is mainly hull construction (Table 2-14), with the option of undertaking machinery manufacture and outfitting as well.

Ships are designed and built to meet the requirements of the owner and/or operator. These requirements include the designated use of the vessel, the minimum deadweight carrying capacity, a specific tonnage limit, a specified speed at sea, maximum fuel consumption per shaft horsepower limitation, as well as other items which influence the basic ship design.[7] In general, because it is custom-built, the construction of an oceangoing vessel is an involved, time-consuming process. According to the evidence available for the United States, which may or may not be applicable to Canada, the time of lapse from the commencement of construction to final delivery of the vessel can vary from 14 to 36 months, depending on the type of ship and where it is constructed.[8]

In addition to the obvious labour requirements for design staff and managerial personnel, a typical shipyard has need for a basic inventory of capital plant and equipment. At least one building berth or building dock with a site spacious enough to accommodate

the hull construction functions is a prerequisite. Moreover, the shipyard will require a quay or jetty deep enough to allow the mooring alongside of launched vessels should it reserve for itself some of the outfitting work. Aside from these fundamental requirements, the shipyard will need to be equipped with the capital equipment indicated in Table 2-15.

Traditional shipbuilding was concerned with a series of sequential steps involving fabrication and assemblage of individual parts in a piece-by-piece manner. Over time, however, this production process has given way to another process which involves batch production of standardised components. This switch was undertaken in order to simplify production as much as possible and reduce the amount of skilled labour by replacing it with automated equipment. Consequently, labour intensity in world shipbuilding has declined over time. Canadian evidence based on Statistics Canada data reveals much the same pattern (Table 2-16). During the early 1960s the Canadian shipbuilding industry was highly labour intensive, judging by the fact that wages and salaries accounted for slightly less than half of the value of gross output (in current dollars). But by 1984 the share of wages and salaries had declined to about a quarter of the value of gross output. This decline in labour intensity was accompanied by a significant increase in material intensity, as to be expected with the assemblage of parts. Of the materials used in the industry, the principal items are engines and engine parts, which accounted for 68.7 per cent of the total cost of materials used in shipbuilding in 1984, followed by carbon steel plates (8 per cent), pipes and tubes (4.8 per cent), and boilers (1.8 per cent). These products are produced by the metal industries, namely, primary and fabricated metal products industries, and by the machinery industry. The materials used in shipbuilding for 1984 accounted for 0.3 and 0.2 per cent of the value of shipments of the metal products and machinery industries. Thus it is reasonable to conclude that the shipbuilding industry does not exert a significant multiplier effect on any of these industries.

INDUSTRIAL STRUCTURE

In the past, shipbuilding was mainly concentrated in countries which were very active in shipping. For example, eight of the world's largest shipping nations in 1931 were also among the top 10 shipbuilders (Table 2-17). But since the 1950s, the reliance on domestic merchant fleets has declined, as is confirmed by the data for 1984. One reason for the decline in the importance of domestically produced fleets in traditional shipbuilding countries like the United Kingdom and the United States is the increase in competition from low-cost producers like Japan and South Korea. Another important reason is the rise of the open registry, which has permitted ships owned by foreigners to register under a "flag of convenience" of one of a small number of countries including Liberia, Panama, Bahamas, Bermuda, Cyprus

and, until 1980, Singapore. A recent study[9] estimates that the share of world shipping operating under open registries has grown from 4 per cent to almost one-third of total gross tonnage during the past 30 years. As a result of these factors, the reliance of ship owners on domestic fleets has declined. However, as can be seen from Table 2-18, certain countries are still able to reserve their domestic fleet requirements for the domestic shipbuilders. A similar situation seems to exist in Canada too (Table 2-19).

Table 2-20 shows the capacity of certain Canadian shipyards. However, by comparison with many other shipyards in the world, Canadian yards tend to be quite small. For example, the Hyundai yard in South Korea and IHI yard in Japan reported annual average capacities of 1 million deadweignt tons.[10] And even the Nippon Kokan yard in Japan, which is one of the smaller yards in that country with an annual capacity of 250,000 deadweignt tons appears to be quite large by Canadian standards.

In the remainder of this section, we consider some of the barriers to entry in the shipbuilding industry. The entry barriers frequently mentioned in the literature[11] include capital requirements to entry, advertising, research and development expenditures, economies of scale, risk, and high concentration. Real net capital stock in shipbuilding averaged $0.92 per unit of output (RDP) during 1961-83, compared with $1.55 in manufacturing.[12] Thus, capital requirements to entry in shipbuilding seem to be rather modest compared with manufacturing, despite the fact that the capital infrastructure cost of establishing a shipyard may still be considerable. Of the other entry barriers mentioned earlier, advertising and R&D intensity appear to be of minor importance in shipbuilding. The four-firm concentration ratio (based on shipments) for 1982 was 57.4 per cent, which is slightly higher than the 56.4 per cent reported for 1980 but considerably lower than the 66.1 and 66.5 per cent reported for 1958 and 1974 respectively.[13] Thus the shipbuilding industry can be described as only moderately concentrated, when one compares it with other industries such as breweries (98.8 per cent) and tobacco products (97.2 per cent). The figures in brackets are the four-firm concentration ratios for 1982. Note, however, that in the case of commercial or non-governmental shipbuilding activity, the relevant market is the international rather than the domestic market. Since the international market is highly competitive, domestic shipbuilders may not be able to exercise their monopoly power. But as mentioned before, during the 1980s the government has become the principal client of the industry. Given the heavy emphasis of procurement policy on Canadian content, the relationship between the government and the shipbuilding industry resembles to some extent a case of bilateral monopoly. Thus, although concentration ratios and other entry barriers may not be very meaningful in the discussion of commercial shipbuilding, they may still be relevant

to the shipbuilding industry as a whole because of the dominant role played by procurement policy.

Another important characteristic of shipbuilding is that it is heavily dominated by Canadian-owned firms. In 1981, 91.1 per cent of the value added was accounted for by domestic firms.[14] The relative absence of foreign firms is probably due to poor output growth and the relatively low entry barriers in the industry.[15]

Inter-corporate links are not a major factor in Canadian shipbuilding. Neyertheless, there are at present a few important corporate groups.[16] The leading group is the Montreal-based Marine Industries Limited, which owns three shipyards-MIL Davie of Lauzon, Quebec which specializes in shipbuilding and repair, MIL Vickers of Montreal which specializes in industrial operations and, MIL Tracy in Sorel, Quebec which specializes in offshore construction and the manufacture of hydro-electric equipment. Marine Industries Limited is partly controlled by the Quebec government through Societé général de financement (65 per cent of shares) and by Alsthom Atlantique, a French industrial conglomerate which also owns one of France's biggest shipbuilders. Alsthom Atlantique owns the remaining 35 per cent of the shares of Marine Industries Limited.

A second group is controlled by Canadian Shipbuilding and Engineering Company Limited. It owns Port Arthur and Port Weller shipyards in Ontario as well as Pictou shipyard in Nova Scotia. It also owned Collingwood Shipyard in Ontario until its closure in 1985. Besides these groups, two shipyards - Newfoundland Dockyard and Herb Fraser Incorporated in Port Colborne, Ontario - are owned by Marine Atlantic and Algoma Central Railway respectively. Finally, there is also some degree of provincial government ownership in the Canadian shipbuilding industry. Georgetown Shipyard in Prince Edward Island is owned by the Provincial government, and Marystown Shipyard is owned by the Newfoundland government. The control exercised by Quebec government over Marine Industries Limited has already been mentioned. Halifax-Dartmouth Industries Limited, which is a leading shipbuilder in Nova Scotia, although not owned by the Provincial government, has received funding from that government on a continuing basis.

Economies of scale is another important barrier which must be considered in the discussion of entry barriers. The larger the economies of scale, the more an entrant's output will depress industry price, given any elasticity in industry demand. A comparison of the size of plants between 1984 and 1978 reveals that there has been an increase in the number of establishments in the 100-199 and 200-499 groups. Thus, it seems that minimum efficient size of plant is the 100-199 group, which in 1984 accounted for 5.8 per cent of shipments in current dollars (Table 2-21).

The foregoing relates to plant scale economies. In addition, it is important to consider firm scale economies. The latter includes economies of vertical integration, multi-plant operations, and economies of multi-product operations. In addition to the examples of multi-plant operations cited earlier, a few others can be mentioned. They include Versatile Pacific and Halifax-Dartmouth Industries, both of which own two shipyards each. Apart from these instances, most of the other companies seem to own only a single shipyard. Multi-product operations are also relatively uncommon. Even with regard to vertical integration, it seems to be the exception rather than the general rule. There are only a few examples of vertical integration in Canadian shipbuilding. One is Canadian Steamship Lines which owns Port Weller Shipyard as a joint venture with Upper Lakes Shipping Company. Another is Rivtow Limited, which is a tug and barge company in the west coast which owns a shipyard in Vancouver. Finally, Seaspan, which is also a tug and barge company previously owned by Genstar, used to own the Genstar Shipyard in Vancouver. However, after the takover of Genstar by Imasco in 1986, the Genstar Shipyard was sold to the public and it has reverted to its old name, Vancouver Shipyard.[17]

The risk factor is also sometimes mentioned as a barrier to entry. As a rough approximation, we calculated the coefficient of variation of net profits after taxes as a percentage of total assets for the period 1974-84. The coefficient of variation for shipbuilding was 9.05, compared with 1.00 for manufacturing. Thus the element of risk measured in terms of the variability of profits is considerably higher in shipbuilding than in manufacturing.

On balance, then, this review of the barriers to entry shows that they are relatively modest in shipbuilding, with the possible exception of the risk factor. Before concluding this section, we should discuss the degree of diversification in the shipbuilding industry by examining two key indicators -- the Enterprise Specialization Ratio (ESR) and the Ownership Specialization Ratio (OSR). ESR is the value added of an enterprise's primary industry divided by all its value added. This gives an indication of the relative importance of an enterprise's primary activity to its other activities. A value of ESR close to one signifies that diversification is minor. OSR measures the degree to which establishments classified to an industry are controlled by enterprises whose primary activity is that industry. Table 2-22 presents evidence on ESR and OSR for the shipbuilding industry. Diversification has experienced a significant decline, judging from the ESR. The data for 1980 shows that there is very little diversification in the industry, which, however may not be true for the more recent years. Unfortunately, more recent data are not available. With regard to OSR, because of confidentiality problems, the evidence for the earlier years is presented in the form of size ranges. This evidence reveals that, whereas during

the early 1970s the bulk of the shipyards were owned by firms in the shipbuilding industry, this is no longer the case today. Thus there has been an erosion in the "independence" of the shipbuilding industry because many of the shipyards are now owned by firms whose primary activity is not in this industry.

PRODUCTIVITY

The best way of gauging an industry's performance over time is by examining its productivity growth since it reflects the efficiency of its production. We have already discussed the behaviour of output per employee. Another measure of productivity is output per person-hour. During the 1962-84 period, the increase in output per person-hour in shipbuilding was roughly at the same annual rate as in manufacturing (Table 2-23). But this result is due to the inclusion of the 1962-64 period when productivity growth in shipbuilding was about two-and-a-half times the growth in manufacturing. If the early 1960s are left out and attention is focused solely on productivity growth since 1965, a different picture emerges. Productivity growth in shipbuilding during the 1965-84 period was only 1.08 per cent per year, which is less than half of the growth rate of 2.41 per cent for manufacturing. For the more recent period 1975-84, there has been virtually no productivity growth in the shipbuilding industry. Productivity growth during this period was only 0.31 per cent per year, compared with 1.70 per cent per year for manufacturing. This evidence reinforces the previously mentioned view that shipbuilding is a declining industry. We do not know all of the factors which caused productivity growth to be lower in shipbuilding than in manufacturing. But one factor must be the slower growth in demand, as can be seen from the relationship between output growth and productivity growth, which of course could run both ways. As demand slowed down, productivity growth also declined. So did many of the other variables. One is employment growth. Another is the number of establishments in the industry. The decline in these variables was mentioned earlier. Furthermore, profitability in shipbuilding has remained considerably below that of manufacturing. The available evidence based on pre-tax profits as a percentage of total assets, shows that during the period, 1974-84, average nominal profitability in shipbuilding was about 2.2 per cent compared with 8 per cent in manufacturing (Table 2-24).

INTERNATIONAL COMPETITIVENESS

Unit labour costs in Canadian shipbuilding increased from 0.14 dollars in 1961 to 1.04 dollars in 1984 (Table 2-25). But this alone cannot provide an indication of the international competitiveness of the industry. Unfortunately, due to data limitations it is not possible to compare Canadian unit labour costs with those in other countries such as Japan and South Korea. However, analysis undertaken for the United States shows that

Japan has much lower costs of production than the United States. For instance, a comparison made in 1983 of United States built ships with those built in Japan shows that regardless of the type of ship, the Japanese had a decisive advantage over the United States (Table 2-26). One reason for this is lower wages paid in countries like Japan and Singapore (Table 2-27), but certain other cost items such as capital, fuel, maintenance and insurance were also much lower in Japan, especially when Singaporean crews were employed. More recent evidence reveals a narrowing of the wage differential between Canada and other countries, including NICs. However, the wage advantage enjoyed by NICs is still considerable (Table 2-28). It is also interesting to note that in a questionnaire circulated to shipbuilders[18] in the United States, they were asked to indicate the relative superiority of domestic over foreign firms in various aspects of international competitiveness - e.g., price, availability, and cost of raw materials and of labour, skill level of labour, technology, and research and development. Except for certain categories such as labour quality and technology, foreign firms scored very heavily over their domestic counterparts in most of the others. The Canadian situation is probably no better than the U.S. It must also be mentioned that although Japan still leads in terms of technology,[19] the recent depreciation of the won relative to the Japanese Yen, coupled with relatively low wages, has enabled South Korea to make rapid gains.[20] Hence the competitive advantage enjoyed by South Korea may have increased some more since the time of the U.S. questionnaire.

We are unable to obtain direct evidence on international cost comparisons between Canada and the other shipbuilding countries. But there is some indirect evidence which suggests that Canada's costs are much higher than in many other countries. One piece of evidence comes from recent bids for similar vessels (Table 2-29). In example 1, the Korean bid is lower than the Canadian, although the lowest Canadian bid appears to be competitive with the Japanese. In examples 2 and 3, the Canadian bid is considerably higher than the lowest bid.

A second piece of evidence is from a survey of productivity in selected shipbuilding countries undertaken by Appledore Company (1981). Productivity was measured in terms of man hours per ton. The study plotted a curve linking labour productivity with labour costs (Chart 2-1). In terms of productivity, Canada was at the low end of the curve, slightly ahead of South Korea and the United Kingdom. But because of the lower wages paid in South Korea, that country had much lower labour costs than Canada.

Thus, despite the fragmentary nature of the foregoing evidence, the overall conclusion seems to be that the Canadian shipbuilding industry is not internationally competitive. This is partly due to productivity which appears to be lower in Canada than in many other countries such as Japan and partly due to the higher wages

in the Canadian shipbuilding. Another reason often given for the lack of international competitiveness of Canadian shipbuilding is that foreign governments tend to subsidize their shipbuilding to a greater degree than Canada. However, it is extremely difficult to substantiate this claim. First, we need information on the nature and the amount of subsidies paid to shipbuilding in Canada and her competitors for a specific year, say, 1970. And then we need to calculate by how much the subsidies have increased over time. The data for such an exercise are not available. However, several observations are in order. First, studies undertaken on other industries and sectors show that foreign subsidies have not been a major factor in the economic performance of these industries. For instance, a recent U.S. study,[21] which attempted to estimate the impact of foreign-trade practices on the trade deficit in the manufacturing sector in the United States, found no conclusive evidence in support of the hypothesis. Whether a similar conclusion applies to shipbuilding has yet to be determined. Second, as will be discussed later, many of the other countries have reduced assistance to shipbuilding since the late 1970s. Third, in some countries such as Japan, subsidies have been given to encourage shipbuilding firms to move out of the industry. For these reasons, even if foreign subsidies had an adverse impact on Canadian shipbuilding in the past, it may not be so serious now.

GOVERNMENT ASSISTANCE TO SHIPBUILDING

Governments around the world have often assisted the shipbuilding industry in numerous ways. Such assistance has ranged from direct output and capital subsidies to tariffs, government procurement, and export financing (Table 2-30).

The decline in the demand for vessel construction which began during the mid-1970s and has continued to the present day prompted many shipbuilding countries to initially increase their subsidies. A good example is Sweden. In 1970, shipbuilding subsidies accounted for 9.5 per cent of real value added in Sweden. But by 1978, their share had climbed to 107.3 per cent.[22] In Japan, the government responded almost immediately to the decline in demand by reducing assistance and encouraging a reduction in shipbuilding capacity. For example, during the 1965-69 period, approximately 72.8 per cent of the gross tonnage of all vessels built in Japan benefitted from government assistance to some extent.[23] But during the 1975-79 period, only about 30.4 per cent of the gross tonnage built received any assistance. Since then, the share of gross tonnage which benefitted from government assistance had risen to 52.9 per cent during 1980-83.

South Korea is one of the countries which apparently did not reduce assistance to shipbuilding during the late 1970s and 1980s. On the contrary, there was an increase in the assistance provided by the government, which took the form of tax incentives to R&D and investment, direct subsidies, loans and loan guarantees from

the Korea Development Bank (KDB) and the National Investment Fund (NIF). In 1975, NIF provided 1,027 million wons (in current prices) of loans, which accounted for 4.9 per cent of total loans to shipbuilding. By 1983, its lending to the industry had increased to 137,346 million wons or 18.7 per cent of total loans.[24] Despite this, it is not clear how much government assistance has contributed to the growth of Korea's shipbuilding industry. Profits in shipbuilding have declined and excess capacity has increased during the 1980s. According to a recent commentator, national or government-controlled yards have expanded, while private yards have suffered.[25] Indeed, the preliminary indications are that South Korea's shipbuilding industry is also currently experiencing a reduction in its capacity.[26]

The Canadian shipbuilding industry has also received considerable government assistance over the years. The most important form of assistance has been direct subsidies, which were in existence from 1961 to 1985 (Chart 2-2). The total amount paid in direct subsidies during this period was $1,029 million (current dollars). Of this amount, about $50 million (current dollars) was for the modernization of shipyards. The remainder, representing about 95 per cent of the total amount, was paid in direct production subsidies. Generally, to qualify for the subsidies, firms needed to purchase a certain proportion of their machinery and parts from Canadian sources.

Another important form of assistance is export financing undertaken by the Export Development Corporation. The EDC performs several functions. Its main activity is the provision of direct loans to foreign purchasers of Canadian ships. One of the requirements to qualify for EDC assistance is Canadian content. Canadian parts, machinery, and equipment must be used in the construction of the ship to the extent that such materials are available. The EDC also insures exporters for most risks involved in foreign trade throughout the world. In general, the EDC insures commercial and political risks up to 90 per cent of the value of sales, with the remaining 10 per cent to be covered by the exporters. The EDC also provides guarantees that enable financial institutions to recover all of their invested funds in case of default. Between 1971 and 1980, the total amount of loans approved by the EDC was $7,715 million (current dollars), of which $912 million (current dollars) was allocated to shipbuilding (Table 2-31). In short, approximately 12.0 per cent of total EDC loans during 1971-80 was for shipbuilding. During the 1980s, EDC assistance to shipbuilding declined considerably as a result of the decline in exports. In 1983, for instance, EDC financing was $39.9 million (current dollars), which was only 4 per cent of the total amount of loans it had extended during that year. Since then, shipbuilding is not mentioned in any of the EDC annual reports as one of the industries which received funding from the agency. A recent study[27] has calculated the implicit subsidy in

EDC financing not just for shipbuilding, but for all industries. It found the implicit subsidy rate to range from 6.75 to 17.13 per cent of export sales, depending on the assumptions made regarding the supply of foreign funds to Canada.

Tariffs have also been used to protect the shipbuilding industry in recent years. Today the normal rate of duty on an imported ship is 25 per cent. However, prior to the passage of the 1983 Customs and Excise Offshore Application Act, ships built in the British Commonwealth entered duty-free; the GPT tariff rate on vessels from such countries as South Korea was one-half of the normal rate; and drilling rigs were subject to a zero tariff if operating offshore. This Act removed all of these exemptions so that a uniform tariff rate of 25 per cent applied to all vessels (except rigs, 20 per cent), irrespective of their origin.[28]

Tax incentives have also been used from time to time to help shipbuilding. Since 1949, the original owner of a Canadian-built ship was entitled to an accelerated capital depreciation allowance of 33-1/3 per cent per annum, declining on a straight line basis, compared with 15 per cent per annum for foreign-built ships. In 1981, the accelerated depreciation was amended so that domestically-built ships were entitled to 16-2/3 per cent in the first year, 33-1/3 per cent in the next two years, and 16-2/3 per cent again in the fourth year. From 1957 to 1975, tax relief was made available for conversions and the building of replacement vessels in Canada. Under this program, depreciation recaptured on the sale of a ship was exempted from taxation if the proceeds were used either for conversion or construction of a replacement ship.

In discussing the various means used to assist the shipbuilding industry, one should also mention shipping subsidies, which would have the effect of raising the demand for ship construction because of the preference given to domestic shipbuilders. In 1973, federal government subsidies to ferries and coastal shipping services amounted to 68.2 million (current dollars), which was about 21 per cent of all federal subsidies to transportation. But by 1983, the most recent year for which the data are available, federal subsidies to ferries and coastal shipping had climbed to 185.7 million (current dollars). But as a percentage of total transportation subsidies, it was 18.3 per cent, which is lower than the 1973 figure.[29]

Of all of these forms of assistance, procurement has become the most important during recent years, as was discussed in an earlier section. A recent DRIE study argues that shipbuilding is one of the most heavily subsidized industries in Canada. According to it, direct industry subsidy assistance alone amounted to $5,059 (current dollars) per worker during 1979-1982. It cites a Department of Finance study which found that during the fiscal years 1982-83 and 1984-85, shipbuilding received federal

assistance of $6,200 (current dollars) per job, compared with only $1,424 (current dollars) per job for manufacturing.[30]

SUMMARY AND CONCLUSIONS

To sum up, the Canadian shipbuilding industry has displayed symptoms of a declining industry. Demand has declined over time, especially during the 1980s. As a result, real output, employment and productivity have experienced negative growth during the 1962-84 period. Profits in shipbuilding have also been poor compared with manufacturing. The contraction of the shipbuilding industry would have been much greater if not for government orders and repairs and conversions. The industry is heavily subsidized, mainly through direct subsidies during the 1961-85 period and, more recently, mainly through procurement policy. Despite the assistance provided by the government, plant closures have been a common occurrence both in Canada and elsewhere. Table 2-32 presents evidence on plant closings during the 1975-83 period. Since 1983, in Canada, there have been many more closures including Collingwood, Breton Industrial, Bel Air, Rivtow, and Seaspan.

NOTES

1 The Honourable Edward Lumley, Minster of Industry, Trade and Commerce/Regional Economic Expansion, Canada's Shipbuilding Industry Performance, Prospects and Policy Options (Ottawa: ITC/DREE, 1982), p. 34.

2 Based on data found in Statistics Canada, Manufacturing Industries in Canada: National and Provincial Areas (Cat. 31-203 Annual), 1984 (Ottawa: Supply and Services Canada), various pages.

3 The Honourable Edward Lumley, ... op. cit., p. 25.

4 Ibid., p. 9.

5 "Two much dead weight," The Economist, November 15, 1986 p. 82.

6 United States International Trade Commission, Analysis of the International Competitiveness of the United States Commercial Shipbuilding and Repair Industries (Washington, D.C.: USITC, April 1985), p. 16.

7 McGraw-Hill Encyclopedia of Science and Technology, "Shipbuilding" (New York: McGraw-Hill), vol. 12, 1977, p. 331.

8 United States International Trade Commission..., op. cit., p. 2.

9 S. R. Toldfari, K. J. Button, and D. E. Pitfield, "Shipping costs and the controversy over open registry," Journal of Industrial Economics, vol. XXXIV, no. 4, June 1986, p. 409.

10 Daniel Todd, The World Shipbuilding Industry (New York: St. Martin's Press, 1985), p. 259.

11 See, for example, Dale Orr, "An index of entry barriers and its application to the structure-performance relationship," The Journal of Industrial Economics, vol. XXIII, no. 1, September 1974, pp. 39-50.

12 These figures are based on data from Statistics Canada, Fixed Capital Flows and Stocks, Cat. 13-568, Occasional 1926-78, and Cat. 13-24, Annual, various issues. For shipbuilding, the data was supplied by Statistics Canada, National Wealth and Capital Stock Section.

13 Statistics Canada, Industrial Organization and Concentration in the Manufacturing, Mining and Logging Industries, Cat. 31-402, Biennial (Ottawa: Supply and Services Canada, October 1983), 1980, Table 1, p. 62.

14 Statistics Canada, Domestic and Foreign Control of Manufacturing, Mining and Logging Establishments in Canada, Cat. 31-401, Biennial (Ottawa: Supply and Services Canada, July 1985), 1981, Table 2, p. 86.

15 See, for example, P. K. Gorecki, "The determinants of entry by domestic and foreign enterprises in Canadian manufacturing industries," Review of Economics and Statistics, November 1976, pp. 485-488.

16 I am deeply indebted to Mr. Henry Walsh, past President, Canadian Shipbuilding and Ship Repairing Association, for helpful discussions on this aspect.

17 Matthew Horseman, "Crawford's Imasco-president pulls all the strings of rebuilt giant," Financial Post, February 2-8, 1987, p. 1.

18 United States International Trade Commission, ... op. cit., p. 47.

19 Canada Department of Regional Industrial Expansion, Shipbuilding, Ship Repair and Offshore Market Investigation, study prepared by A & P Appledore Ltd. (Ottawa: DRIE, September 1984), DRIE Document No. DRIA: 0003, vol. 3, p. 408.

20 United States International Trade Commision..., op. cit., pp. 99-107.

21 Robert Z. Lawrence and Robert E. Litan, "The protectionist prescription: Errors in diagnosis and cure," Brookings Papers on Economic Activity (Washington, D.C.: Brookings Institution), 1:1987, pp. 289-310.

22 Carl Hamilton, "Public subsidies to industry: The case of Sweden and its shipbuilding industry" Seminar paper no. 174, Institute for international economic Studies, Stockholm, Sweden, June 1981, Table 3, p. 8A.

23 United States International Trade Commission..., op. cit., p. 83.

24 Ibid., p. 105.

25 According to Y. S. Yoon, President of Daewoo Shipbuilding and Heavy Machinery Limited, South Korea, cited in "South Korea is

optimistic about its shipbuilding", Toronto: Globe and Mail, May 12, 1986, p. 31.

26 "Full Astern," The Economist, June 7, 1986, p. 81.

27 Arvin D. Jelliss and Chun-Yan-Kuo, "On measuring the economic subsidy of export sales financing," Economic Development and Cultural Change, vol. 35, no. 5, July 1987, p. 842.

28 Michael J. Trebilcock, The Political Economy of Economic Adjustment. (Toronto: University of Toronto Press, 1986), pp. 101-102.

29 Canadian Transport Commission, Research Branch, Transport Review, trends and selected issues, 1985 (Ottawa: Supply and Services Canada, October 1985), p. 53.

30 Canada Department of Regional Industrial Expansion, Automotive, Marine and Rail branch, The Canadian Shipbuilding and Repair Industry Sector Profile (Ottawa: DRIE, May 1987), p. 54.

Table 2-1

Transportation Equipment Industries, Canada, 1984

S.I.C.	Industry	Per cent of total industry value of shipments
		(in current $)
3211	Aircraft and parts	5.02
3231	Motor vehicles	65.38
3241	Truck and bus body and trailer	0.67
3242	Commercial trailer	0.76
3243	Non-commercial trailer	0.46
3244	Mobile home industry	0.19
3251	Motor vehicle engine and parts	6.67
3252	Motor vehicle wiring assemblies	0.50
3253	Motor vehicle stampings	3.31
3254	Motor vehicle steering and suspension	1.20
3255	Motor vehicle wheel and brake	1.77
3256	Motor vehicle plastic parts	1.72
3257	Motor vehicle fabric accessories	1.47
3259	Other motor vehicle accessories & parts	5.84
3261	Railroad rolling stock	2.63
3271	Shipbuilding and repair	1.73
3281	Boatbuilding and repair	0.47
3299	Other transportation equipment industries	0.41
	Total	100.0

Source Statistics Canada, Manufacturing Industries of Canada: National and Provincial Areas Ottawa: Supply and Services Canada, 1988), 31-203 Annual, 1985, p. 14.

Table 2-2

Canadian Shipyards, 1961-84

	Number of shipyards		
	1961	1979	1984
Newfoundland	2	4	2
Prince Edward Island	1	2	2
New Brunswick	2	4	4
Nova Scotia	17	13	10
Quebec	10	10	12
Ontario	12	13	9
British Columbia	19	24	15
Manitoba	0	1	1
Total	63	71	55

Source Statistics Canada, Shipbuilding and Repair Ottawa: Supply and Services Canada), Cat. 42-206, 1962, Table 1-A, p. 4; 1979, Table 1, p. 11, and 1984, Table 1, p. 8.

Table 2-3

Constribution of Shipbuilding to Total Economy and Manufacturing, Canada, 1985

	Aggregate economy	Manufacturing
	(Per cent)	
Real domestic product	0.1	0.5
Total employment	0.1	0.6
Exports (current dollars)	0.1	0.1

Source RDP - Cansim
Total Employment - Statistics Canada, Manufacturing Industries of Canada: National and Provincial Areas, Ottawa: Supply and Services Canada), 1985 (31-203, Annual), pp. 2 and 15.
Exports: DRIE, Commodity Trade by Industrial Sector: Historical Summary, 1966-1985, (Ottawa: DRIE, 1986), Section D, pp. D.1, D.4, and D.10.

Table 2-4

Foreign-Built Vessels Registered in Canada, 1968-85

	Gross Tonnage
1968	15,000
1969	20,000
1970	29,000
1971	10,000
1972	43,000
1973	15,361
1974	77,000
1975	125,730
1976	103,367
1977	164,514
1978	67,275
1979	61,068
1980	70,549
1981	143,711
1982	48,750
1983	198,743
1984	235,975
1985	8,233

Source Canadian Shipbuilding and Ship Repairing Association, "Foreign-built vessels registered in Canada," Seaports and the Shipping World (January 1982), p. 40, for data from 1968 to 1980. For data for the period thereafter, from CSSRA, Annual Reports, various issues.

Table 2-5

Growth in Real Output, and Employment in the Shipbuilding and Manufacturing Sectors, Canada, 1962-85

	Shipbuilding			Manufacturing		
	$\dot{Q}$	$\dot{E}$	PROD	$\dot{Q}$	$\dot{E}$	PROD
	(Percentage changes)					
1962-65	11.46	5.75	5.71	9.55	3.05	6.50
1966-70	-9.86	-5.50	-4.36	3.62	1.60	2.02
1971-75	4.67	3.34	1.33	4.30	1.49	1.81
1976-80	3.86	1.50	2.36	2.96	2.47	0.49
1981-85	-8.15	-10.46	2.31	1.96	-0.70	2.66
1962-69	1.44	0.58	0.86	6.97	0.44	6.53
1970-79	2.01	0.77	1.24	3.99	1.62	2.37
1980-85	-10.02	-6.91	-3.11	0.10	-0.91	1.01
1962-85	-0.06	-1.01	0.95	4.27	1.52	2.75
1970-85	-2.50	-2.11	-0.39	2.46	0.67	1.79

$\dot{Q}$ Real domestic product

$\dot{E}$ Total employees

PROD Output per employee

Source RDP data from Cansim. Employment data for shipbuilding industry from Statistics Canada, Shipbuilding and Boatbuilding (Ottawa: Supply and Services Canada), 42-218 Annual, 1966, 1980 and 1984; for manufacturing, the data are from Statistics Canada, Manufacturing Industries of Canada: National and Provincial Areas (Ottawa: Supply and Services Canada), 31-203 Annual, 1984, Table 5, p. 26.

Table 2-6

New Construction and Repairs and Conversions, Canadian Shipbuilding Industry, 1972-86

	Gross production	New construction	Repairs and conversions	Real new construction as a per cent of real gross production
		(In '000 [1971] dollars)		
1971	146,879	105,560	41,319	71.9
1972	214,833	172,947	41,886	80.5
1973	208,167	155,160	53,007	74.5
1974	208,167	155,160	42,075	80.0
1975	276,151	222,289	53,862	80.5
1976	244,743	195,457	49,286	79.9
1977	235,573	169,529	66,044	72.0
1978	241,111	171,491	69,620	71.1
1979	225,804	155,248	70,556	68.8
1980	238,078	165,965	72,113	69.7
1981	240,909	145,906	95,003	60.6
1982	261,329	179,768	81,561	68.8
1983	154,445	100,618	53,827	65.2
Annual rate of growth (per cent)				
1972-75	18.96	24.20	8.83	
1976-80	-2.74	-5.35	6.89	
1981-83	-10.41	-10.91	-5.47	

The data in current dollars for 1984, 1985 and 1986 are as follows:

	Gross production	New construction	Repairs	Share of new construction in total (per cent)
		('000 current $)		
1984	538,889	288,204	250,685	53.5
1985	692,474	462,410	230,064	66.8
1986	559,743	332,189	227,554	59.3

Source Current dollar data from Canadian Shipbuilding and Ship Repairing Association, Annual Statistical Report (Ottawa: CSSRA, April 1986),1985, Table 16, p. 24. 1986 figures were kindly made available by CSSRA on personal request. Gross output price deflator data taken from Statistics Canada, Gross Domestic Product by Industry (Ottawa: Supply and Services Canada), 61-213 Annual, 1980, p. 43 and 1984, p. 44.

Table 2-7

Commercial Shipbuilding Activity in the United States, 1979-84

	New construction	Repairs	Total	Ratio of new construction to total
	In millions of current dollars (U.S.)			(%)
1979	1,890	1,052	2,942	64.2
1980	1,810	1,397	3,207	56.4
1981	1,542	1,601	3,143	49.1
1982	1,240	1,588	2,878	43.1
1983	873	2,596	2,469	35.4
1984	600	915	1,515	39.6

Source U.S. International Trade Commission, Analysis of the International Competiveness of the U.S. Commercial Shipbuilding and Repair Industries (Washington, D.C.; USITC Publication 1676, April, 1985), p. 11.

Table 2-8

Composition of Vessels Built in Canada, 1975-86

Vessel types	1975-77	1984-86
	Gross tonnage (In millions of gross tons)	
Government	4.66	8.02
Tankers	116.79	0
Cargo barges	38.49	2.07
Bulk carriers	58.54	22.93
Tugs	1.13	0.21
Ferries	8.80	11.42
Fishing vessels	2.10	0.11
Offshore supply vessels	0	1.50
Offshore drilling rigs	0	8.07
Miscellaneous	7.68	0.54
Total	238.19	54.87

Source Canadian Shipbuilding and Ship Repairing Association, Annual Report, 1980, Table 3, and Annual Report, 1986, Table 6.

Table 2-9

The Role of Government Vessels in Canadian Shipbuilding, 1973-86

Year	Vessels under construction or on order		
	Government vessels	Total tonnage of all vessels	Government vessels as a percentage of total tonnage
	(Gross tonnage)		
1973	11,650	491,616	2.37
1974	650	361,975	0.18
1975	7,420	698,780	1.06
1976	6,840	498,640	1.37
1977	9,112	423,814	2.15
1978	6,536	256,208	2.55
1979	9,250	321,225	2.88
1980	9,250	353,126	2.62
1981	8,950	309,750	2.89
1982	0	325,904	0
1983	52,938	171,036	30.95
1984	59,330	151,677	39.12
1985	56,360	90,210	62.48
1986	38,700	40,350	95.91

* Source Canadian Shipbuilding and Ship Repairing Association, Annual Reports, various issues.

Table 2-18

Construction of Merchant Vessels, World, 1965-84

	Gross tonnage launched					Country shares of world total				
	1965	1970	1975	1980	1984	1965	1970	1975	1980	1984
	(000 Gross registered tons)					(Per cent)				
United Kingdom	1,073	1,237	1,304	244	191	8.78	5.70	3.63	1.75	1.08
United States	270	338	1,004	558	118	2.21	1.56	2.80	4.00	0.67
Japan	5,363	10,476	17,978	7,288	9,408	43.90	48.30	50.08	52.30	53.06
South Korea	0	0	441	629	2,515	0	0	1.23	4.51	14.18
Netherlands	233	461	951	125	161	1.91	2.13	2.65	0.90	0.91
Norway	409	639	1,029	319	97	3.35	2.95	2.87	2.29	0.55
Poland	334	463	608	395	320	2.73	2.13	1.69	2.83	1.80
Spain	295	926	1,638	509	150	2.41	4.27	4.56	3.65	0.85
Sweden	1,170	1,711	2,461	338	177	9.58	7.89	6.86	2.43	1.00
West Germany	1,023	1,687	2,549	462	528	8.37	7.78	7.10	3.32	2.98
East Germany	0	334	338	340	362	0	1.54	0.94	2.44	2.04
France	479	960	1,301	328	229	3.92	4.43	3.62	2.35	1.29
Finland	119	222	257	198	317	0.97	1.02	0.71	1.42	1.79
Denmark	260	514	961	227	393	2.13	2.37	2.68	1.63	2.22
Brazil	64	100	389	615	460	0.52	0.46	1.08	4.41	2.59
Italy	442	598	847	168	241	3.62	2.76	2.36	1.21	1.36
Yugoslavia	264	393	639	123	214	2.16	1.81	1.78	0.88	1.21
Canada	183	33	206	80	45	1.50	0.15	0.57	0.57	0.25
World	12,216	21,690	35,898	13,935	17,732	100.00	100.00	100.00	100.00	100.00

Source United Nations, Statistical Yearbook, 1973, p. 308, and 1984, pp. 726-728.

Table 2-11

Annual Volume of Orders Placed, Shipbuilding Industry, World, 1968-1986

Year	Orders	Percentage change
	(Millions of gross tons)	(%)
1968	26.14	-
1969	30.05	14.96
1970	41.03	36.54
1971	29.64	-27.77
1972	30.36	2.43
1973	73.60	142.42
1974	28.37	-61.46
1975	13.79	-51.40
1976	12.94	-6.17
1977	11.09	-14.30
1978	8.03	-27.60
1979	16.84	109.71
1980	18.97	12.65
1981	17.23	-9.18
1982	11.23	-34.83
1983	19.48	73.46
1984	15.59	-19.97
1985	12.91	-17.20
1986	12.80	-0.86
	Average annual rates of change	
1968-86		6.75
1975-86		1.19
1980-86		-0.61

Source Lloyds Register or Shipping, Annual Reports, various issues.

Table 2-12

World Order Book by Type of Vessels, 1976 and 1980

	1976	1980
	(In millions of gross tons)	
Oil tankers	17.12	9.83
Ore and bulk carriers	14.62	13.48
Bulk/oil carriers	2.76	1.77
Container ships	2.30	0.98
General cargo	8.51	2.28
Specialized carriers	5.65	3.42
Total	52.72	34.63

Source Lloyd's Register of Shipping, Annual Report, 1976, Table 3, p. 16; and Annual Report, 1980, Table 3, p. 7.

Table 2-13

Oceangoing Merchant Shipping, World, 1959-1983

Year	Goods loaded				Goods unloaded			
	Total	Petroleum	Loaded petroleum products	Dry cargo	Total	Crude petroleum	Petroleum products	Dry cargo
	(In thousands of metric tons)							
1959	996,257	316,156	164,168	515,933	993,935	316,892	151,539	525,504
1965	1,671,291	622,101	243,392	805,798	1,674,572	622,031	220,655	831,886
1970	2,608,592	1,109,890	332,509	1,166,193	2,532,725	1,101,205	298,542	1,132,886
1975	3,071,516	1,363,450	281,728	1,426,338	3,026,407	1,365,368	287,058	1,373,986
1980	3,675,695	1,499,388	354,095	1,822,212	3,710,746	1,522,829	326,274	1,861,643
1983	3,287,123	1,110,225	392,663	1,784,235	3,311,382	1,142,184	349,592	1,819,606
	Rate of change (per cent)							
1959-83	230.02	25.13	139.2	245.7	233.1	260.3	130.7	246.0
1959-75	208.43	331.3	71.6	176.4	204.4	330.6	90.1	115.4
1975-83	7.00	-19.30	39.4	25.1	9.4	-16.4	21.8	32.4

Source United Nations, Statistical Yearbook, various issues.

Table 2-14

Shipyard Functions

(a) Hull construction	(b) Machinery	(c) Outfitting
(1) Steel preparation - straightening or mangling, short-blasting, priming of plates and sections (2) Steel cutting - either handcutting from templates or by use of frame-cutting machines controlled from a scale-drawing or computer tape (3) Steel bending - to conform to ship's contours (4) Unit preparation - welding of steel into units (5) Assembly erection - blocks assembled on a berth or in a dock to complete hull construction	The process of adding propulsion system to the ship. Entails manufacture of machinery in a forge or foundry either at the shipyard or elsewhere.	The process of adding non-structural and non-propulsion items to a ship. May be undertaken by shipyard's own outfitting tradesmen or workers provided by subcontractors.

Source Daniel Todd, The World Shipbuilding Industry (New York: St. Martin's Press, 1985), p. 29.

Table 2-15

Shipyard Capital Equipment Requirements

(a) Function	(b) Capital equipment needed
(1) Steel receipt and storage	Railway facilities or truck transshipment facilities, cranes or conveyors, Extensive storage area.
2) Blastcleaning or pickling	Blastcleaning/pickling vat. Rail cars, tractors, trucks, conveyors, cranes.
(3) Steel marking	Templates, NC marking equipment. Conveyors, cranes.
(4) Steel Cutting	Burning equipment and skids. Cranes.
(5) Rivet punching	Multiple punches, drills. Conveyors and cranes.
(6) Cold forming	Rolls, presses. Cranes.
(7) Hot forming	Furnaces, presses, forms and jigs. Cranes.
(8) Intermediate storage (I)	Railway facilities, trucks. Cranes sizeable storage area.
(9) Precut parts assembly	Jigs, welding equipment, joining brackets, burning equipment. Cranes.
(10) Intermediate storage (II)	Railway facilities, trucks. Cranes Sizeable storage area.
(11) Erection on ways	Rail or tractor facilities. Cranesor gratries. Welding equipment. Building berth or dock.
(12) Out-fitting	Welding and burning equipment. Cranes Quay or Jetty.

Source Adapted from D. M. Mack-Forlist and A. Newman, The Conversion of Shipbuilding from Military to Civilian Markets (Praeger, New York, 1970), pp. 38-39.

Table 2-16

Labour and Material Intensities in Canadian Shipbuilding, 1961-83

	Labour	Materials and energy
	(As a percentage of nominal gross output)	
1961	46.8	36.9
1971	40.5	40.6
1981	37.4	44.4
1984	28.5	47.6

Source Based on data from Statistics Canada, Shipbuilding and Boatbuilding (Ottawa: Supply and Services Canada), cat. 42-218, various issues.

Table 2-17

World's Leading Shipping Fleets and Shipbuilding Countries, 1930 and 1984

1930					1984				
Country	Shipping fleet (In 000 gross tons)	Rank	Gross tonnage launched (In 000 gross tons)	Rank	Country	Shipping fleet (In 000 gross tons)	Rank	Country	Gross tonnage launched (In 000 gross tons)	Rank
United Kingdom	20,322	1	1,472.0	1	Liberia	62,025	1	Japan	9,408	1
United States	13,103	2	221.0	2	Japan	40,358	2	South Korea	2,515	2
Japan	4,317	3	151.0	5	Panama	37,244	3	Federal Germany	528	3
Germany	4,199	4	246.0	3	Greece	35,059	4	Brazil	460	4
Norway	3,663	5	53.8	9	United States	19,292	5	Denmark	393	5
France	3,471	6	98.9	8	Norway	17,663	6	German Democratic Republic	362	6
Italy	3,262	7	86.8	6	United Kingdom	15,874	7	Poland	320	7
Netherlands	3,079	8	152.9	4	China	9,300	8	Finland	317	8
Sweden	1,594	9	132.0	7	Cyprus	6,728	9	Romania	263	9

Source United Nations, Statistical Yearbook, various issues.

Table 2-18

Structure of World Shipping,
1960, 1970, and 1980

Country	1960			1970			1980		
	A	B	C	A	B	C	A	B	C
	('000 gross tons)		%	('000 gross tons)		%	('000 gross tons)		%
France	4,809	404	96	6,458	809	73	11,925	191	93
Denmark	2,270	159	76	3,314	62	74	5,390	174	98
Germany	4,537	312	99	7,881	1,254	59	8,356	345	78
Italy	5,122	361	100	7,448	512	100	11,096	200	98
Netherlands	4,884	424	78	5,207	266	86	5,724	141	76
United Kingdom	21,131	1,651	72	25,825	2,703	39	27,135	502	52
Norway	11,203	887	21	19,347	2,190	17	22,007	522	34
Sweden	3,747	304	84	4,921	367	71	4,234	142	76
Spain	1,801	160	99	3,441	477	100	8,112	281	100
United States	24,837	453	94	18,463	381	87	18,464	856	100
Japan	6,931	808	100	27,004	4,117	100	40,960	2,735	100
Greece	4,529		--	10,952		--	39,472		--
Liberia	11,282	2,433	--	33,297	8,522	--	80,285	7,012	--
Panama	4,236		--	5,646		--	27,657		--
Other	21,451		--	48,286		--	109,094		--
World	129,770	8,356	60	227,490	21,690	44	419,911	13,101	53

A Merchant fleets registered in selected countries.
B Additions to fleet completed during the year.
C Percentage of additions domestically-built.

Source Lloyds Register of Shipping, Statistical Tables 1981, London.

Table 2-19

The Canadian Merchant Fleet by Country of Origin of Build, December 30, 1980

	Canadian-built	Foreign-built	Per cent Canadian
	(Number of vessels)		(Per cent)
Tankers	34	5	87.2
Dry bulk carriers	94	35	72.9
Tugs	198	54	78.6
Barges and scows	1,248	107	92.1
General cargo	16	13	55.2
Ferries	47	8	85.5

Source ITC/DREE, Canada's Shipbulding Industry Performance, Prospects, and Policy Options, Background Paper (Ottawa: ITC/DREE, 1982), p. 35.

Table 2-20

Capacity of Selected Canadian Shipyards, 1985

Name of shipyard	Capacity (in tons)
Vancouver Shipyard	10,000
Halifax-Dartmouth	15,000
Marine Industries	8,000
Marystown	4,000
Pictou	5,000
Port Arthur	6,000
Port Weller	10,000
Saint John Shipbuilding	50,000
Versatile Pacific	20,000

Source Canadian Shipbuilding and Ship Repairing Association, Canadian Shipbuilding and Allied Industries (Ottawa: CSSRA, 1986), 7th edition, 1986, various pages.

Table 2-21

Changes in the size of Plants, Canadian Shipbuilding, 1978-84

Average number employed	1984 Number of establishments	1978 Number of establishments
0-4	1	4
5-9	1	5
10-19	6	6
20-49	16	20
50-99	10	12
100-199	7	5
200-499	9	5
500-999	3	4
1000	2	3
Total	55	64

Source Statistics Canada, Shipbuilding and Boatbuilding (Cat. 42-218 Annual), 1978, p. 6 and 1984, p. 9.

Table 2-22

Measures of Diversification, Canadian Shipbuiding Industry, 1970-80

	Enterprise specialization ratio	Total number of enterprises	Ownership specialization ratio
1970	0.5896	56	L
1972	0.5965	49	M
1974	0.4006	53	M
1976	0.5455	53	M
1978	0.8917	57	M
1980	0.9364	60	0.4925

Size ranged due to confidentiality problem

Where L = 60-79.99 %
M = 40-59.99 %

Source Statistics Canada, Industrial Organization and Concentration in the Manufacturing, Mining and Logging Industries (Ottawa: Supply and Services Canada, 1980), Cat. 31-402 Biennial, p. 144.

Table 2-23

Growth in Real Output and Real Output per Person Hour in Shipbuilding and Manufacturing Industries Canada, 1962-1984

	Shipbuilding		Manufacturing	
	Output[1]	Productivity	Output	Productivity
	Annual rates of change (per cent)			
1962-64	13.92	7.81	8.21	3.24
1965-69	-2.24	0.20	6.23	2.52
1970-74	2.93	2.35	5.37	3.72
1975-79	1.68	0.08	2.60	1.65
1980-84	-9.51	0.54	0.09	1.75
1962-69	3.82	3.05	6.97	3.73
1970-79	2.31	1.22	3.99	2.68
1962-84	0.26	1.71	0.09	1.75

1 Output refers to real domestic product (1971 dollars).

Source Based on Cansim Data.

Table 2-24

Profits Before Taxes as a Percentage of Total Assets (Current Dollars)

	Shipbuilding	Manufacturing
	(Per cent)	
1974	4.8	12.1
1975	3.7	9.8
1976	4.9	11.9
1977	1.4	10.4
1978	-2.1	9.2
1979	3.6	9.3
1980	5.8	2.4
1981	3.1	3.1
1982	0.5	-9.0
1983	-1.1	9.3
1984	-0.2	18.1
1974-84 (average)	2.2	8.0

Source Data supplied by Corporation Financial Statistics Group, Statistics Canada.

Table 2-25

Unit Labour Costs, Canadian Shipbuilding, 1961-84

Year	Shipbuilding
	(In dollars)
1961	0.14
1965	0.14
1970	0.26
1975	0.40
1980	0.64
1984	1.04

Unit labour costs defined as wages and salaries divided by real domestic product.

Source Wages and Salaries from Statistics Canada, Shipbuilding and Boatbuilding (Cat. 42-218), various issues. Real Domestic Product from Cansim.

Table 2-26

Shipbuilding Costs, United States and Japan, 1983

Country	Containership (2,450 20-foot equivalent units)	Bulk carrier (35,000 dead-weight tons)	Tanker (90,000 deadweight tons)
	(In millions of dollars)		
United States built	132.0	69.0	96.0
Japanese built	50.8	22.5	34.3

Source United States Congressional Budget Office, United States Shipping and Shipbuilding: Trends and Policy Choices (Washington, D.C.: U.S. Government Printing Office, August 1984), p. 27.

Table 2-27

Annual Operating Costs for 30,000 Deadweight Ton Containerships, United States and Japan, 1983

Ship comparisons			
Where built	United States	Japan	Japan
Crew nationality	United States	United States	Singapore
Propulsion	Steam	Diesel	Diesel
	(In thousands of U.S. dollars)		
Ship costs			
Wages	3,780	3,780	570
Subsistence	124	124	53
Supplies	247	247	158
Maintenance	1,050	1,050	471
Insurance	933	933	328
Other	77	77	30
Fuel	5,500	4,600	4,600
Capital	14,200	5,200	5,200
Cargo/Port	4,600	4,600	4,600
Total	30,511	20,611	16,010
Cost per delivered ton	61	41	32

Source United States Congressional Budget Office, United States Shipping and Shipbuilding: Trends and Policy Choices (Washington, D.C.: U.S. Government Printing Office, August 1984), p. 31.

Table 2-28

Average Hourly Earnings in Major Shipbuilding Countries, 1975 and 1985 (In Current U.S. Dollars)

Country	Average hourly earnings 1975	Index (U.S. = 100) 1975	Average hourly earnings 1985	Index (U.S. = 100) 1985
United States	6.89	100	11.57	100
Canada	6.83	99	10.47	91
Japan	3.93	57	9.24	80
South Korea	0.60	9	2.58	22
Singapore	1.18	17	3.05	26
Belgium	8.15	118	10.23	88
Denmark	7.04	102	9.64	83
France	5.17	75	10.76	93
West Germany	7.09	103	10.69	92
Greece	2.01	29	5.16	45
Italy	5.75	83	9.25	80
Netherlands	7.07	103	10.11	87
United Kingdom	3.67	53	7.07	61

Source Canada, Department of Regional Industrial Expansion, The Canadian Shipbuilding and Repair Industry, Ottawa, May 1987, p. 21.

Table 2-29

Recent Bid Packages 1980-84

	Canada	Japan	Korea	Canada relative to lowest bid
	(Millions of $)			(Per cent)
Example 1 (1980) Supply vessel	19-28	19	15	+28
Example 2 (1983) Bulk carrier*	30	20	-	+50
Example 3 (1984) (offshore rig)	108	-	61	+77

* Canadian bid included cost of $5 Million in offset purchases and cost of Export Development Corporation Financing.

Source DRIE, The Canadian Shipbuilding and Repair Industry: Sector Profile (Ottawa: DRIE, 1985), p. 19.

Table 2-30

Government Assistance to the Shipbuilding Industry in the Major Western Industrialized Countries, early 1980s

Country	Direct subsidies	Export credit assistance (to shipbuilders)	Insurance[1]	Domestic credit assistance (to shipowners)				OECD[2] signatory	Other
					Credit share	Repayment period	Interest[a]		
Japan	None to shipbuilders.	Up to 80 per cent of contract price.	Yes	JDB: Commercial banks:	Max. 70% Max. 100%	13 years 8 years	Variable c. 9%	Yes	Customs duty exemption for components. Cargo preference system.
South Korea	Available for vessels engaged in foreign trade.	Up to 80 per cent of vessels costs, repayment period of 8 years and interest rate of 9 per cent.			Max. 92%	7-12 years	9% +	No	Reduced custom duties on components and in certain case VAT exemption. Cargo perference system.
Federal Republic of Germany	Federal: Direct subsidies terminated in 1981 but grants available to owners for 12.5 per cent of construction cost; in 1982, DM 170 million was available. Local: Coastal States grant financial aid to yards.	Market interest rate is subsidized by a maximum of two per cent.	Yes		Max. 57.5%	8.5 years	2% below market rate	Yes	Some exemption from customs duties for components. No customs duties on ships.

Table 2-30 (Cont'd.)

Country	Direct subsidies	Export credit assistance (to shipbuilders)	Insurance[1]	Domestic credit assistance (to shipowners)				OECD[2] signatory	Other
					Credit share	Repayment period	Interest		
Spain	Domestic and export orders are eligible for maximum subsidy of 9.5 per cent of contract price.	Export credits cover 70 per cent of contract price at eight per cent interest repayable over 7 years. Special conditions relating to export to LDCs.	Yes	New:	Max. 85%	12 years	8%	Yes	Customs duty of 12.4 per cent on imported vessels, 9.3 per cent on vessels of EEC origin. Customs duty exemption for components. Government purchases restricted to domestic yards.
				Conversion/ repair:	Max. 70%	5 years	8%		
					Max. 92%	7-12 years	9% +	No	
Canada	Construction subsidy available equal to 9 per cent of approved costs of shipbuilding (not available for ships delivered after June 30, 1985.	In accord with the OECD Understanding on Export Credits for Ships.	Yes	None				Yes	Customs duty of 25 per cent on ships, duty remission on imported components and parts if used in export ship.
Finland	Not granted.	Cost guarantee scheme for exports. Export credits available in accord with OECD.	Yes		Max. 80%	8 years	9.25%	Yes	

Table 2-30 (Cont'd.)

Country	Direct subsidies	Export credit assistance (to shipbuilders)	Insurance[1]	Domestic credit assistance (to shipowners)			OECD[2] signatory	Other
				Credit share	Repayment period	Interest		
United States	Construction Differential Subsidy: To compensate for cost differences between United States and foreign-built ships. Up to 50 per cent vessel costs may be subsidized. Operating Differential Subsidy: Subsidizes differences in operating costs.	Exim bank for export financing.	Yes	Maritime Administration guarantees obligations to aid construction financing up to 87.5 per cent of vessel's costs; interest rate is variable.			No	Inter-coastal trade and cargo preference systems. ("Jones act") 1983 research contributions. US $20 million.
Nether-lands	production subsidies available depending on vessel cost. Also investment premium scheme.	Government pays interest support dependent on size of contract over period of 8.5 years.	Yes	As per OECD terms, but with (maximum) interest subsidy of 2 per cent.			Yes	Imported components exempt from customs duties. No customs duties on ships.
Belgium	None.	In accord with the OECD Understanding on Export Credits for Ships.	Yes	Loans up to 70 per cent of value, state guarantee, interest rate reduction up to a maximum of .3 per cent. Recoverable financial aid.			Yes	Materials and equipment exempt from import duty.

Table 2-30 (Cont'd.)

Country	Direct subsidies	Export credit assistance (to shipbuilders)	Insurance[1]	Domestic credit assistance (to shipowners)			OECD[2] signatory	Other
				Credit share	Repayment period	Interest		
Denmark	Not granted.	Credits available for export of second-hand ships less than 10 years old.	Yes	Max. 80%	12 years	8%	Yes	No customs duties on sea-going vessels. Components exempt from customs duties.
Britain	17 per cent of contract price under the Shipbuilding Intervention Fund.	Credits available for export second-hand ships less than 10 years old.	Yes	Max. 80%	8.5 years	8%	Yes	No customs duties on sea-going vessels. Components exempt from customs duties.
Norway	Interest rate subsidy scheme with maximum governmental contribution of Krone 1,000 million p.a.	Norwegian Guarantee Institute warrants export credits.	Yes	30% (New scheme provides state guarantee for up to 18 per cent of the contract price, by guaranteeing 60 per cent of second priority mortgage; the latter usually covers 30 per cent of contract price.)				
Sweden	Subsidy in form of production bonus paid from 1980-84.	Up to 80 per cent export loan guarantees available.	Yes	Max. 90%	12 years	9.8%	Yes	Imported components exempt from customs duties. No customs duties on ships.

Table 2-30 (Cont'd.)

Country	Direct subsidies	Export credit assistance (to shipbuilders)	Insurance[1]	Domestic credit assistance (to shipowners)			OECD[2] signatory	Other
				Credit share	Repayment period	Interest		
France	Construction subsidies granted of between 10 per cent to 20 per cent of contract price depending on both vessel and size of yard. Operational and investment subsidies also available.	Private financial institutions may grant state-guaranteed ship export credits at standard OECD terms.	Yes Yes	Interest Subsidy:	60% 7 years		Yes	Coastal services restricted to vessels under French registry. No customs duties on ships, but import permit required.
Ireland	No.	Up to OECD Understanding on Export Credits for Ships.	Yes Never used	Credit facilities outlined in the OECD Understanding on Export Credit for Ships.			Yes	No customs duties on ships.
Italy	Between 17 and 23 per cent of the amount of shipbuilding contract, differentiated according to yard size and on a falling scale.	In accord with OECD Understanding for Export Credits for Ships.	Yes		12 years	8%	Yes	No customs duties on ships. No customs duties on components.

1 Export Credit Insurance availability.
2 Signifies whether producer has signed OECD Understanding on Export Credits for Ships.

Source Same as Table 2-29, pp. 38-41.

Table 2-31

EDC Loan Approvals, by Product Category, 1971-80

	1971-75	1976-80	1971-80	Share of total 1971-80
		(Millions of current $)		%
Industrial equipment	397	2,094	2,491	32.3
Aircraft and parts	177	297	474	6.1
Railway rolling stock	231	117	348	4.5
Shipbuilding	702	210	912	11.8
Communications equipment	188	298	486	6.3
Electrical equipment	440	293	733	9.5
Nuclear energy	380	1,307	1,687	21.9
Unclassified products	95	490	585	7.6
Total	2,610	5,104	7,715	100.0

Source Export Development Corporation, Canadian Capital Goods Exports and EDC Financing: An Economic Assessment (Ottawa: EDC, 1982), Section 3, Chapter 3, p. 19.

Table 2-32

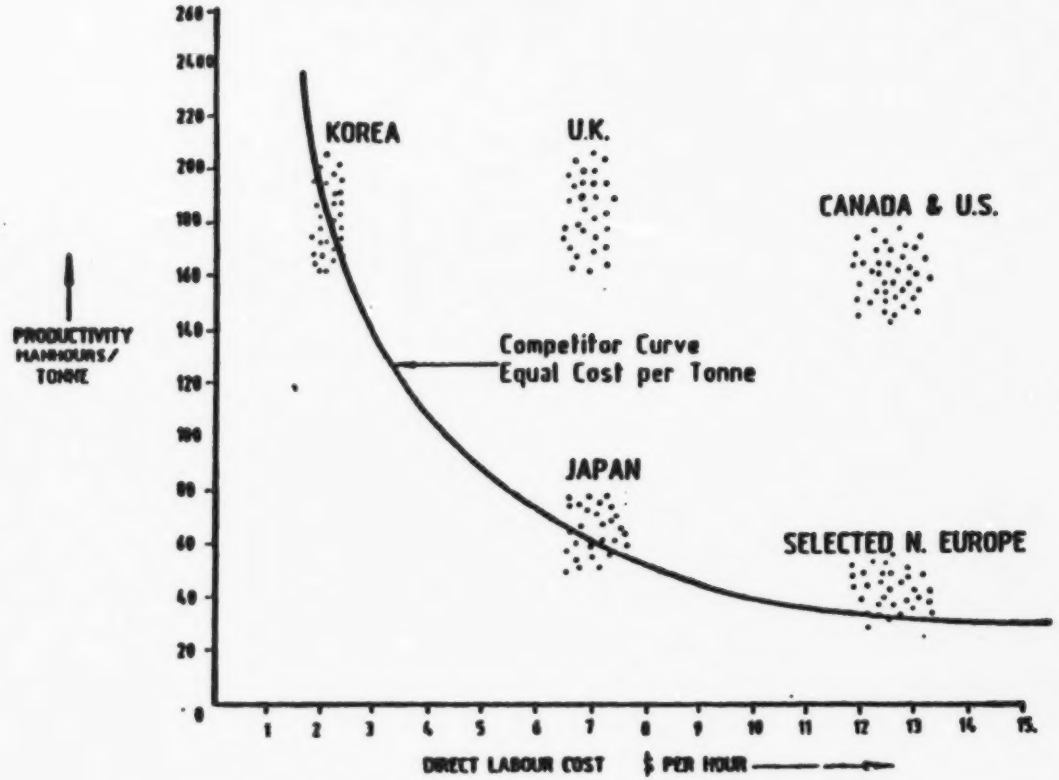
Shipyards Closing During the 1975-83 Period

Country	Number of companies	Number of berths or docks expunged	Capacity removed ('000 dwt) (estimate)
Belgium	1	2	6
Denmark	1	1	8
Finland	1	2	5
France	7	8	>3
Ireland	2	5	>6
Italy	5	24	12
Netherlands	23	68	>76
Norway	6	7	>8
Spain	3	4	20
Sweden	6	11	553
United Kingdom	11	46	>20
West Germany	12	37	60
Japan	7	30	>105
Singapore	2	8	6
Turkey	1	1	8
Australia	5	14	167
South Africa	2	4	35
Brazil	1	1	26
Canada	5	14	>11
United States	8	19	?

Source Daniel Todd, The World Shipbuilding Industry (New York, St. Martin Press, 1985), p. 266.

Chart 2-1

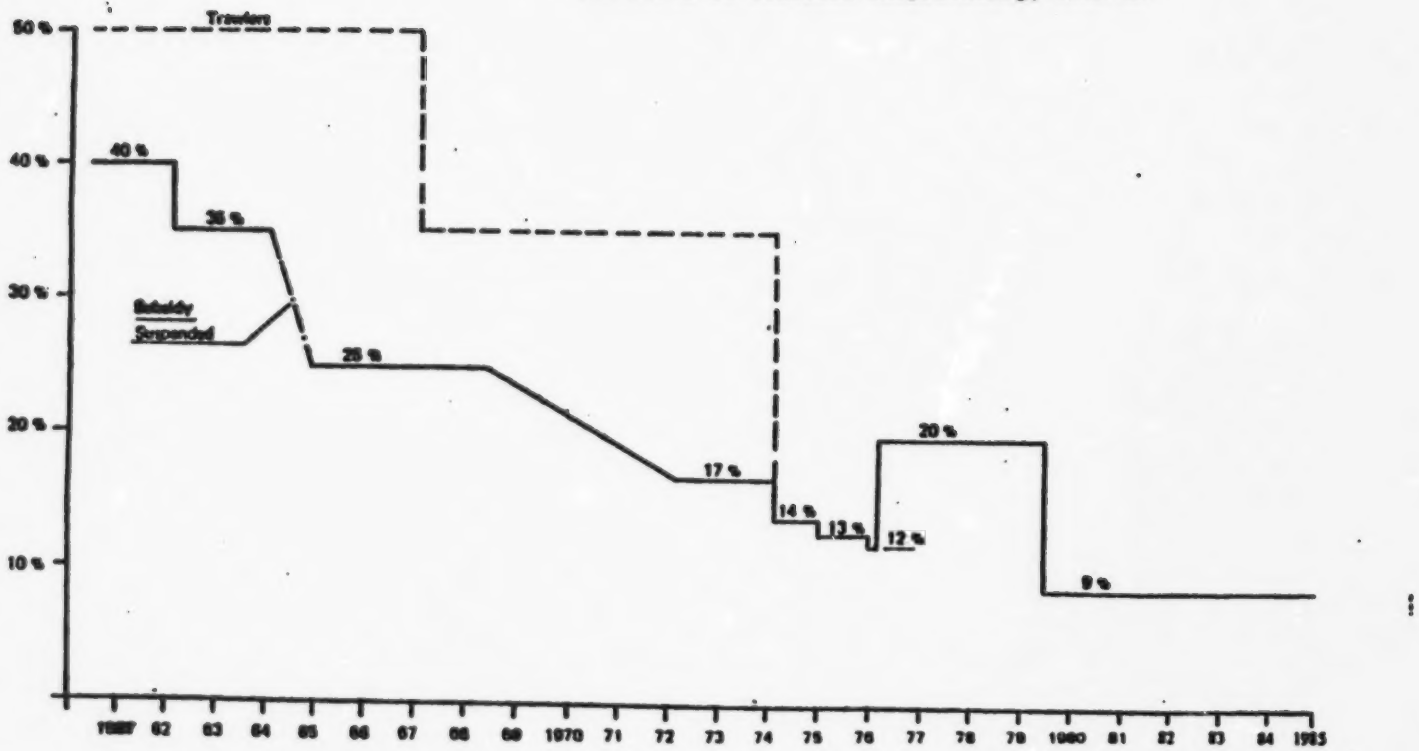
Competitiveness in Shipbuilding During the Early 1980s



Source: A & P Appledore Limited, Shipbuilding, Ship Repair and Offshore Market Investigation, Volume 3 - Shiprepair and Offshore (Ottawa: DRIE, September 1984), Document No. DRIA:0003, p. 407.

Chart 2-2

Subsidies to Canadian Shipbuilding, 1961-85



Source: The Hon. Edward Lumley, Minister of Industry, Trade and Commerce/Regional Economic Expansion, Canada's Shipbuilding Industry Performance, Prospects and Policy Options (Ottawa: ITC/DREE, 1982), p. 70.

3 THE EVOLUTION OF SHIPBUILDING POLICY IN CANADA, 1940-86

The previous chapter dealt with an overview of the Canadian shipbuilding industry. Its main conclusion was that shipbuilding is competitively a very weak industry, characterized by a general contraction in output and employment and very little productivity growth during the 1970-85 period. The government responded to the decline in shipbuilding by bringing in various assistance measures, notably subsidies and procurement. This chapter deals with the historical evolution of the subsidy programs. This historical exercise is intended to provide the reader with a better appreciation of the Shipbuilding Industry Assistance Program (SIAP), which is the main focus of this study.

GOVERNMENT ASSISTANCE DURING THE 1940s AND 1950s

During the 1940s and 1950s, the government was not heavily committed to the growth of a domestic shipbuilding industry. Government's thinking at that time was reflected in the position taken by the Canadian Maritime Commission (CMC), which was set up in 1947 to recommend to the Minister of Transport policies pertaining to the operation and promotion of shipping and shipbuilding in Canada. In its second report, released on June 30, 1949, CMC gave the following reasons why the government should not encourage shipbuilding.[1] First, there was the problem of excess capacity in the industry, which was expected to continue into the foreseeable future. Second, the operating and construction costs were considerably higher in Canada than elsewhere, especially the United Kingdom. For these reasons, the CMC was not in favour of promoting a domestic shipbuilding industry. However, for national security reasons, it felt that Canada should maintain a construction and repair capability and a small ocean-going fleet.

In a policy statement issued in December 1949, the Prime Minister argued against subsidizing the shipping and shipbuilding industries:

> In considering the studies which are available to us on the subject, we have concluded that we are not justified from an economic viewpoint in maintaining a Canadian flag fleet by artificial means. It is not the intention of the government to maintain an industry at the expense of the taxpayer, and of other export industries, by the unhealthy method of subsidies, unless these countervailing considerations are very strong indeed.
>
> There are many objections to shipping subsidies. They do not promote a healthy and efficient industry. They

> constitute a steady and usually increasing drain upon public funds. In a world in which some types of ships are already in oversupply, they represent a waste of the taxpayer's money.[2]

Thus the government's view was that there was no economic justification for encouraging the growth of the shipbuilding industry. But on national security grounds, it advocated the formation of a NATO shipping pool to which Canada could make a contribution.

The policy measures that were passed during the 1940s and 1950s reflected the above thinking. Specifically, three measures were introduced. The first, known as the Replacement Plan, was presented in 1948 and was aimed at reducing and modernizing the Canadian merchant marine fleet.[3] This was felt necessary at the time, partly because of excess capacity and partly because of the rapid obsolescence of the Canadian fleet, which was built during the war. However, a major factor preventing a reduction in the fleet was that under the terms of the original sale ships had to be operated under the Canadian flag and could not be sold abroad. But the new Replacement Plan overcame this problem by permitting sales abroad on condition that the shipowner deposited the proceeds in an escrow fund administered by CMC. This fund was to be used to purchase new vessels or convert old ones.

The second important measure which was introduced in 1949 was the Transfer Plan, which permitted Canadian shipowners to take advantage of the lower operating costs and higher freight rates in the United Kingdom by transferring their ships to British registry, provided these ships remained under Canadian ownership and control.[4] The transferred ships were to be considered as a Canadian contribution to any allied shipping pool that might be created in an emergency.

In addition to the above measures, the government also brought in the Canadian Vessel Construction Act[5] in December 1949, under which vessels constructed and registered in Canada were given favourable depreciation treatment for income tax purposes. Whereas in the past, depreciation for income tax was calculated at 15 per cent of the original cost on a diminishing balance, the new Act permitted 33-1/3 per cent on original cost until the vessel was fully written off for tax purposes. A similar provision applied to conversions and major alterations.

As a result of the Replacement Plan, the number of ships sold by Canadian shipowners increased from 36 in 1949 to 180 in 1960.[6] There was also a slight increase in the number of ships transferred to British registry, from 93 in 1950 to 98 in 1955 but thereafter, the number of ships transferred experienced a steady decline to 17 in 1964, due to heavy losses incurred in shipping.[7]

The combined effect of these measures was a drastic reduction in the Canadian merchant fleet, from 169 ships in 1952 to 19 in 1964. In terms of tonnage, there was a decline from 1,187 thousand gross tons in 1952 to 147 thousand gross tons in 1964. These changes were reflected in the growth rates of employment and real output in the shipbuilding industry. Employment growth during 1949-60 was -0.90 per cent per year, while real output growth was only 0.94 per cent per year.[8] By contrast, real output growth in the manufacturing sector during the same period was 4.41 per cent per year. At the regional level, except for the Atlantic provinces, which experienced an increase in employment growth of 3.25 per cent per year, all the other regions recorded a decline in shipbuilding employment during the 1949-60 period.[9]

The dismal prospects facing the industry led the Canadian Shipbuilding and Ship Repairing Association (CSSRA) to turn to the government for assistance. In a brief presented to the Royal Commission on Coasting Trade in June 1955, the CSSRA dealt with the problems of the industry. It pointed out that Canadian shipyards were at a major disadvantage with foreign yards due to higher construction costs, particularly wage rates. Whereas Canadian shipyards paid hourly wage rates ranging from $1.28 to $1.92 during the early 1950s, shipyards in the United Kingdom, Germany, and the Netherlands paid only 60 cents, 47 cents, and 44 cents per hour respectively, all in Canadian currency.[10] Moreover, the operating costs of vessels were much greater in Canada than in many other countries. In 1952, the daily cost of operating a 10,000 ton deadweight standard wartime-built vessel was $816 in Canada, compared with $543.50 in the United Kingdom.[11] The cost advantage enjoyed by foreign-built vessels contributed to their increasing importance in Canada's overseas trade. In 1947, foreign-registered vessels accounted for 79.8 per cent of Canada's overseas trade; by 1965, their share had risen to 99.3 per cent. Foreign-built vessels, however, were not necessarily confined to those on foreign registry because some Canadian-registered vessels were also foreign-built. The data show that during the 1955-60 period, on the average, about 50 per cent of the Canadian merchant fleet was foreign-built.

To correct the above situation, the CSSRA requested the government to restrict Canada's overseas trade to ships registered and built in Canada and to ensure that replacements and additions to the Canadian fleet were built only in Canadian shipyards. The same demand was repeatedly made in several annual reports of the CSSRA during the late 1950s.[12] In the Annual Report for 1959-60, the CSSRA made an additional demand, namely, tax incentives to the shipbuilding industry.[13] No reasons were given for favouring tax incentives over other types of government assistance.

THE ESTABLISHMENT OF THE SHIP CONSTRUCTION ASSISTANCE REGULATIONS (1961)

The government's immediate response to the problems of the shipbuilding industry was to make increasing use of procurement policy. Whereas in 1958 the government's share of the value of vessels constructed or under construction was 65 per cent, it had reached 83 per cent in 1959. Since then, the government's share declined slightly to 77 per cent in both 1960 and 1961.[14] Despite the increase in government orders, there was no quick relief in sight as employment plunged from 16,823 in 1958 to 9,814 in 1961, its lowest level since 1950. Internationally too, the industry experienced a decline in gross tonnage launched from 9,270 thousand gross tons in 1958 to 7,940 thousand gross tons in 1961.

The continued decline in the shipbuilding industry led to an intensified campaign for assistance by the CSSRA. In January 1959, it started a series of newsletters designed to win public support. For instance, in a newsletter dated February 1960, the CSSRA explained why the government should play an active role in Canadian shipbuilding.[15] The reasons given included tax and employment benefits as well as the maintenance of Canada's economic independence and political sovereignty. The CSSRA also held a series of meetings with Cabinet Ministers and government officials with the aim of winning their support for its campaign to win government assistance. These efforts were rewarded because in May 1961, the government announced the creation of the Ship Construction Assistance Regulations (SCAR), under which subsidies were payable on both fishing and non-fishing vessels. But there is no evidence to show that the government undertook any serious analysis to determine the need for assistance before the program was introduced. Incidentally, except for a study done during the early 1980s, there is no published evidence that any analysis was undertaken on any of the subsequent programs either. Under SCAR, in the case of non-fishing vessels, the maximum subsidy was 40 per cent of approved costs if the vessel was constructed between May 12, 1961 and March 31, 1963, and 35 per cent of approved costs if the vessel was constructed after March 31, 1963.[16] Fishing vessels constructed after May 12, 1961 were eligible to a subsidy not exceeding 50 per cent of approved costs on condition that every time a new vessel or, more specifically, a steel fishing trawler, was built, a used steel or wooden fishing trawler was permanently withdrawn from use.[17] This was done in order to encourage the modernization of the fishing fleet. Initially under SCAR, the fishing vessel subsidy was restricted to vessels operating out of a port in New Brunswick, Newfoundland, Nova Scotia, Prince Edward Island, and Quebec.[18] By an amendment introduced in July 1965,[19] this restriction was removed and any fishing vessel could qualify for the subsidy, regardless of where it was used.

All vessels had to satisfy certain other eligibility criteria. One was that both the shipbuilder and the shipowner had to be Canadian citizens or firms incorporated under the laws of Canada. Second, no application for a subsidy was considered if the vessel was already under construction on May 12, 1961. Third, Canadian parts, materials, and equipment had to be used whenever they were available at competitive prices.[20] Fourth, the shipbuilder and the shipowner had to demonstrate that they had the financial resources to undertake the project. Fifth, the shipowner had to give an undertaking to the Minister of Transport to maintain the ship on Canadian registry for a period of five years, during which period it could neither be sold nor transferred without the consent of the Minister of Transport and the Treasury Board.[21]

The administration of SCAR was in the hands of the Canadian Maritime Commission (CMC), which was to review the applications, determine the financial responsibility of the shipowner and the shipbuilder, the eligibility of the project, the degree of Canadian content, and recommend to the Minister of Transport the amount of subsidy to be given.

SCAR was an industry-specific program, in the sense that all shipbuilders could apply for assistance, provided they satisfied the required eligibility conditions. There were no rejections at all. A total of $137 million (in current dollars) was spent between 1961 and 1966, with Quebec being the principal beneficiary (Table 3-1). In terms of the type of vessels, bulk carriers received about a third of the subsidies, followed by ferries, trawlers, and barges (Table 3-2).

After the introduction of SCAR, there was an improvement in the performance of the industry. Real output growth during 1962-65 was 11.46 per cent per year, while employment growth was 5.75 per cent per year. Regionally too, there was an improvement in employment growth during the 1961-65 period except in the Great Lakes region, where there was a decline (Table 3-3). The CSSRA attributed the improvement in the performance of the industry mainly to the new program (SCAR).[22] The first half of the 1960s was also a favourable period for the Canadian manufacturing sector in general. Real output growth in manufacturing during 1962-65 was 8.33 per cent per year, compared with 2.57 per cent per year during 1958-61. Similarly, employment growth in manufacturing increased at an average annual rate of 3.06 per cent in 1962-65, compared with -0.67 per cent during 1959-61.[23] Thus the prosperity enjoyed by Canadian shipbuilding may have been to some extent a spillover effect emanating from the manufacturing to other sectors.

As mentioned before, the government was not fully convinced about the need for assistance, despite the formation of SCAR. Thus, the improvement in shipbuilding prompted the government to suspend the subsidy program in February 1965 and set up an

interdepartmental committee to review government policy toward the industry. Commenting on the government's decision, the CSSRA stated:

> Present indications...are that the employment and production figures for the industry in 1965 will equal, if not better, those of 1964 - which is, of course, all to the good. Unfortunately, this situation puts us in a dilemma. Certain Cabinet Ministers and government officials interpret the level of actual and prospective employment in the present year as proof that there is no immediate urgency for the government to re-instate the subsidy.... We have been unable so far to convince the government that the shipyards will be in serious trouble by mid-1966, or probably earlier, unless the subsidy is restored within the next few months.[24]

The Interdepartmental Committee presented its report to the government in late 1965, and its contents were not made public. Contrary to the forecasts of the CSSRA, 1965 saw a decline in output growth in the shipbuilding industry to 6.1 per cent from 10.1 per cent a year ago. The government wanted to avoid a major slowdown in the industry and therefore reintroduced the subsidy, but at a lower rate than before. The new program, which was known as Ship Construction Subsidy Regulations (SCSR) came into effect in January 1966. Its main objectives were described in a press release in the following manner:

> A first objective is that Canada should maintain a healthy and viable shipbuilding industry. The program is designed to assist in the improvement of overall efficiency to the point where the industry will rely on assistance or protection no greater than that which is accorded other similar Canadian industries.[25]

Under SCSR, the maximum subsidy for an eligible ship other than a fishing vessel was 25 per cent of approved cost when the completion date for construction was between January 1, 1966 and May 31, 1969.[26] The subsidy rate was lower on vessels completed in subsequent periods, the lowest being 17 per cent on vessels constructed after February 28, 1973. The subsidy rate on eligible fishing vessels was originally fixed at a maximum of 50 per cent of approved cost but, as a result of an amendment introduced in December 1967, this was reduced to 35 per cent.[27] The eligibility criteria were similar to those under the previous program (SCAR) with one notable difference, namely, the absence of the Canadian content requirement. The removal of this constraint was dictated by the government's desire to permit Canadian shipbuilders free choice of sources of supply with one exception, namely, steel. An earlier regulation which had enabled shipbuilders to import steel on a duty-free basis was repealed in order to encourage the growth of the domestic steel industry. Major changes were also

introduced to the Canadian Vessel Construction Act (CVCA) of 1949. As mentioned in an earlier section, this Act provided Canadian shipbuilders with accelerated depreciation allowances and also exempted the shipbuilders from taxation of the recaptured depreciation on disposal of a vessel, provided the proceeds were used for conversion or modernization. Permission to use sales proceeds by third parties encouraged the growth of arrangements - popularly known as "angel plans" - under which ships were built for non-shipping companies and leased back to ship operators under hire/purchase agreements with an option to purchase under favourable terms (generally about 60 per cent of the original cost of the ship). The ability of both the original and the final owner to claim capital cost allowances gave rise to tax advantages. According to one study,[28] some 160 per cent of the value of the ship was depreciated successively by the two owners. Under the new program introduced in 1966, the Canadian Vessel Construction Assistance Act was repealed and its provisions relating to accelerated depreciation were incorporated into the Income Tax Act. However, the tax exemption of recaptured depreciation was continued on vessels owned before 1966 so long as the proceeds were used for replacement before 1974.

Between 1966 and 1971, a total of $125 million (current dollars) was spent on construction subsidies. The principal beneficiary was again Quebec, followed by Ontario, British Columbia, and Nova Scotia (Table 3-1). In terms of the type of vessels, trawlers received the bulk of subsidies, followed by bulk carriers (Table 3-2). Despite the subsidy program, there was no noticeable improvement. In fact, one could characterize the period 1966-70 as one of dismal performance in the Canadian shipbuilding industry. Real output declined by 9.86 per cent per year, while employment also fell by 5.50 per cent per year during 1966-70, compared with annual increases of 11.5 and 5.6 per cent respectively during 1962-65. The decline was pervasive, as can be seen from the regional employment data (Table 3-3). The manufacturing sector also experienced a slowdown during 1966-70 but unlike in the case of shipbuilding, the slowdown was not so severe. The annual growth of output and employment in manufacturing was 4.28 per cent and 0.87 per cent respectively during the 1966-70 period. During the late 1960s, there were three major bankruptcies: the Kingston Shipyard, George Davie Limited, and André Shipyard, operated by Victoria Machinery Depot Company. A fourth firm, Canadian Vickers, withdrew from shipbuilding after 58 years in business.[29]

THE ROBERTSON REPORT AND THE INTRODUCTION OF THE SHIPBUILDING TEMPORARY ASSISTANCE PROGRAM (1970)

Because of the difficulties facing the shipbuilding industry and the pressure brought on by the CSSRA, the government set up a committee in 1969 to study the problems in the shipbuilding industry and suggest solutions. This committee was headed by

retired Navy Commodore O.S.C. Robertson and its report was popularly known as the Robertson Report. Another study commissioned during the same time period was the Darling Report, named after its author, H.J. Darling. Both of these reports were released in 1970. The Darling Report mainly dealt with shipping; shipbuilding was discussed only peripherally. Its main recommendations were that Canadian coasting trade and related marine activities such as dredging, salvage, support and supply vessels in offshore drilling should be restricted to Canadian-flag vessels.[30] But there is no published evidence to suggest that any research was done to support these recommendations. It is interesting to note that a study undertaken by the Department of Finance[31] in the same year (1970) went to great lengths to demonstrate why it was not in Canada's interests to have a domestic flag fleet. Unlike the Darling Report, the Department of Finance study based its conclusions on an international cost comparison. It found that operating and construction costs in Canada were much higher than elsewhere, with the exception of the United States.

The Robertson Report accepted the position of the government that the shipbuilding industry "could not expect an indefinite continuation of special assistance and that it was expected to achieve, principally by improved efficiency, a level of comparative costs such that assistance ... would eventually be no longer needed."[32] However, it felt that government assistance should not be stopped immediately because of the severe slump in the industry. The Committee recommended a continuation of the construction subsidy at 23 per cent until 1973, after which it was to decline up to 17 per cent in 1979. The Robertson Committee also gave some thought to increasing capacity utilization in the industry.[33] It considered five specific ways of doing so. They are export expansion, offshore and Arctic exploration, reserving Canada's coastal trade only to Canadian-built vessels, the establishment of a Canadian-built and Canadian-registered deep sea fleet, and encouraging the industry to move into related marine activities or diversification. But the Committee was unable to come up with concrete solutions to improve capacity utilization and ultimately ended up making two relatively weak recommendations. One is that coastal trade be reserved for Canadian-registered vessels which, as the Committee itself acknowledged, was a toothless recommendation unless it ensured that all such vessels would be built in Canada. The latter, however, was rejected because, as the Committee stated, "the effect would be to increase the cost of ships and of domestic shipping services from present levels."[34] Secondly, it recommended that the government and the industry study ways of using offshore and Arctic activities to develop a market for Canadian shipyards. But on one aspect, the Robertson Report was quite explicit. It felt that there was little scope for an increase in demand through export expansion without considerable

government assistance because of the lack of international competitiveness. Hence it did not recommend export subsidies.

The government, however, opted for export subsidies when it introduced the Shipbuilding Temporary Assistance Program (STAP) in 1970. The reason for the government's choice of export subsidization was the buoyant world market at that time, as can be seen from the increase in orders placed and completed. Between 1968 and 1969, new orders for vessel construction in the world increased by 14.96 per cent, and by a further 36.54 per cent between 1969 and 1970. Completions also increased rapidly by 11.28 and 11.95 per cent between 1968 and 1969, and between 1969 and 1970, respectively. Thus, although domestic market conditions were weak, the world market was strong. Hence the government felt that if the industry were to have any chance of success, it must orient its production to export markets. However, the available evidence on international cost differentials showed that Canadian shipbuilders were at a severe disadvantage in relation to their competitors. For example, the data assembled by the Robertson Committee on international wage rates showed that between 1961 and 1968, Canada was second only to the United States in terms of wage rates paid to employees in the shipbuilding industry. It also found that Canadian wage rates had increased faster than in the other countries, including the United States. Hence Canada's cost position had actually worsened over time. To improve international competitiveness, productivity growth should have been the major objective of shipbuilding policy. Unfortunately, STAP did not directly focus on this aspect.

Under the Shipbuilding Temporary Assistance Program (STAP), the eligibility of a ship was to be determined by the Minister of Industry, Trade and Commerce according to the following criteria:

1 the ship had to be for export;[35]
2 Canadian materials were to be used;[36]
3 the project should not lead to an overexpansion of capacity in relation to long-term growth in demand;
4 the shipyard should have facilities to meet domestic requirements for shipbuilding and repair;
5 the project should have a beneficial effect on the long-term competitive position of the firm and of the industry; and
6 the market development aspects of the contract had to be examined before giving out the subsidy.

In the practical application of the above criteria, ITC officials had to rely very heavily on the information provided by the shipbuilder. On item 2, detailed lists of the materials to be used, their prices, and sources of supply had to be submitted by each applicant for a subsidy. ITC officials examined these lists to ensure that the maximum Canadian content possible was achieved. On average, Canadian content amounted to about 60 to 65 per cent of the total materials and components used. Whether the

shipbuilders were able to substitute foreign for domestic materials after the approval of their applications for subsidy had been obtained is not known, although DRIE officials believe that such substitution was difficult because of the close monitoring of the program. Regarding criterion (3), there was no attempt made to check either long-term demand growth or the increase in capacity. In general, criterion (3) was largely ignored, according to some of the program administrators who were interviewed. On item 5, there was a significant divergence between the stated criterion and its practical application. In practice, the program administrators wanted to satisfy themselves that no one shipyard would monopolize the contracts and that the shipyards were willing to share with and subcontract to others. Beyond that, there was no attempt to assess the impact of the subsidies on the long-term competitiveness of the industry and the firm. Item 6 meant that the program administrators wished to make sure that the applicant was an established shipyard and not a "fly-by-night" operation which had been set up merely to take advantage of the subsidy program. Besides that, there was no attempt made to assess the impact of the subsidy on the shipbuilding industry. Thus, in general, the interpretation of the criteria specified in STAP was left to the discretion of the program administrators.

The rate of subsidy under STAP varied according to whether the gross tonnage of the eligible ship was more or less than 25,000 tons and according to the date of contract. On an eligible ship of not more than 25,000 tons gross tonnage, the subsidy rate ranged from 17 to 15½ per cent of the approved cost, depending on the contract date. The maximum rate of 17 per cent applied to contracts signed before September 30, 1971 and the minimum rate of 15½ per cent was applicable to contracts signed between April 1, 1972 and June 29, 1972.[37] On eligible ships of more than 25,000 gross tons, the subsidy rate ranged from 14 to 12½ per cent of approved costs, depending on the contract date and, in a manner similar to that described earlier, for eligible ships of less than 25,000 gross tons.[38] Progress payments were allowed, but they could not exceed, in the aggregate, 80 per cent of the subsidy. Finally, with regard to the Canadian content requirement, shipbuilders were asked to use Canadian materials, parts, and equipment whenever they were available at competitive prices. In general, ITC officials used a 10 per cent price differential between domestic and foreign sources as a rule of thumb in determining Canadian content. If the domestic price exceeded the foreign price by only about 10 per cent, recipient shipbuilders were asked to use Canadian materials.

STAP was originally conceived of as a temporary measure with no new applications to be accepted after June 1972 and all construction had to be completed by the end of October 1975. The cut-off date on new applications was subsequently extended in the first instance for another 9 months until March 31, 1973 because

of the pressure from the CSSRA that the original deadline did not provide sufficient time to shipbuilders to complete negotiations with shipowners and apply for the subsidy.[39] The deadline was extended again, as shown later.

A total amount of $194 million (in current dollars) was spent under STAP. The principal beneficiary, as in the previous programs, was Quebec; it was followed by New Brunswick, rather than Ontario, and British Columbia (Table 3-4). In terms of the type of vessels, the main beneficiaries were tankers and cargo vessels, which received 46.6 and 34.6 per cent of the total, respectively (Table 3-5). This is in contrast to the previous programs - SCAR and SCSR, under which the shares of tankers and cargo vessels in total subsidy payments were only 7.7 and 3.1 per cent, respectively. This emphasis on tankers created a problem of excess supply later on because, as was discussed in Chapter 2, tankers were the worst affected by the energy price increase which occurred during the mid-1970s. Fourteen shipyards received assistance under STAP, of which the top four recipients accounted for 90 per cent of the total (Table 3-6).

During the first half of the 1970s, when STAP was in operation, the shipbuilding industry fared quite well in terms of both real output and employment. Real output increased by 4.7 per cent per year during 1971-75, compared with a decline of close to 10 per cent per year during 1966-70. Similarly, employment increased by 3.3 per cent per year during 1971-75, whereas it had declined by 5.5 per cent per year during 1966-70. The prosperity enjoyed by the industry was felt across Canada in all the regions (Table 3-3). As shown in Chart 2-1 in the previous chapter, before 1972 exports was negligible but, during the 1972-76 period, it increased to about 58 per cent of new construction. Internationally, output measured in terms of gross tonnage launched increased by 10.72 per cent per year during 1971-75, compared with 12.22 per cent per year during 1966-70. But in terms of orders placed, the decline had already started in world shipbuilding. New orders increased by only 0.84 per cent per year during 1971-75, compared with 25.75 per cent per year during 1969-70. In fact, after experiencing an unusually high increase of 142 per cent in 1972-73, new orders continued to decline every year until 1979. It is also interesting to note that, faced with the decline in orders, several of the OECD countries increased assistance to the industry.[40] The main exception was Japan which, as mentioned in the previous chapter, reduced assistance and encouraged the industry to diversify[41] and reduce shipbuilding capacity.

THE MID-1970s

At no stage during this period did the government try to analyze the impact of STAP or to find out the need for continuing the

assistance. Hence it was difficult for the government to adequately assess the industry's demands for continued assistance. According to the CSSRA, STAP was a great success and deserved an extension beyond 1975. This theme was developed at length in a brief presented by the Association to the Minister of ITC in March 1973. Several reasons were given for requesting an extension.[42] First, without an extension, employment in the industry would plummet again. According to the CSSRA, domestic demand (including government orders) was expected to remain low during the near future, thus making the industry rely heavily on exports for its survival. Second, because many shipbuilding countries had increased subsidies to the industry, it was argued that the Canadian shipbuilding industry would need a minimum export subsidy rate of 20 per cent just to keep pace with others. The CSSRA brief also commented on certain other aspects of policy. One was the two-part subsidy element in the STAP, namely, a 17 per cent rate for vessels under 25,000 gross tons and a 14 per cent rate for vessels larger than that. According to the CSSRA, the reason for this discrepancy in the rates was the government's view that the labour cost content in total costs was smaller for larger than for smaller vessels. This, along with the belief that Canada suffered a major competitive disadvantage in terms of labour costs, was thought to have led the government to offer a higher subsidy rate to the smaller vessels than to the larger vessels. But the CSSRA thought that this view was mistaken because the relationship between size and labour cost was thought to be continuous and not subject to a sudden change at some critical value such as 25,000 gross tons, and also because size was only one of the factors which affect labour content. These other factors were, however, not identified. For these reasons,[43] the CSSRA requested the replacement of the two-part subsidy by a flat rate of 20 per cent. The other important aspect discussed in the CSSRA brief was the time schedule of the subsidy program. The CSSRA felt that a temporary subsidy measure would hinder careful planning on the part of the shipyards. The Association wanted the terminal date of the subsidy program to be determined by the economic circumstances facing the industry, rather than by an arbitrarily determined time.[44] In short, it requested an unspecified extension of time on STAP. There was one other major development which occurred during this time and which may have aided the cause of the CSSRA in its campaign for more government assistance. This was the entry of shipbuilding machinery and parts manufacturers to the CSSRA as full-fledged members in 1974. With this new alliance, the CSSRA not only emphasized the need for more funds but also the importance of Canadian content protection to a much greater extent than before.[45]

Several Members of Parliament representing ridings in which shipyards are located also supported the shipbuilders in their demand for an extension of the STAP.[46] One M.P. who is on record as having been critical of the subsidy program was the M.P. for Waterloo-Cambridge who argued that:

> At some point someone has to question whether in terms of the kinds of things we are doing we are getting much benefit from the shipbuilding industry, or whether this is highly desirable for Canada. We recognize that shipbuilding is centered in those areas where there is high unemployment.... But as we look into the future we must ask ourselves whether we want to expand this program, particularly when there is so much risk and so much public money going into its support and development.[47]

But the M.P.'s warning went unheeded as the Minister of Industry, Trade and Commerce, Mr. A. Gillespie, announced an extension of STAP for two more years, until March 1975. The cut-off dates for eligibility for assistance were also extended. Whereas under the original STAP, the subsidy was paid to eligible vessels completed on or before October 31, 1975, the amended Act extended the deadline to October 31, 1978. The two-part subsidy was replaced by a single flat rate of 17 per cent, presumably in response to the request made by the CSSRA.[48]

Another CSSRA brief presented to the Minister of Industry, Trade and Commerce on August 30, 1974 contained further thoughts on how to make the shipbuilding industry internationally competitive. Since this brief seems to have had a major impact on future government policy, it is useful to discuss its main contents. According to the Association's forecasts, the domestic market for shipbuilding was expected to improve during the late 1970s, with regard to commercial and government orders. But the CSSRA felt that domestic orders alone were not sufficient to sustain the growth of the industry; the export market was also important. Hence the CSSRA felt that government policy should be directed at enabling the shipbuilding industry to take advantage of the opportunities in both markets. In addition, the CSSRA wanted the modernization of shipyards and, to achieve that objective, it argued that the government should devise a productivity improvement program through consultation with the industry.[49] The Association felt that the productivity improvement resulting from the proposed program would eventually enable the government to reduce export subsidies by 50 per cent.

THE INTRODUCTION OF THE SHIPBUILDING INDUSTRY ASSISTANCE PROGRAM (SIAP)

In 1975, the government introduced the Shipbuilding Industry Assistance Program (SIAP). The aim of the new program was to increase the international competitiveness of the industry. Once that was achieved, the government wanted to reduce assistance.

SIAP was an attempt at bringing together the existing export subsidy and domestic subsidy programs under a single program. The new program had two key aspects - a construction or output subsidy

and a capital subsidy referred to as "performance improvement grants" to encourage modernization of shipyards. The integration of the domestic and export subsidy programs and the establishment of the performance improvement grants system reflected the influence of the CSSRA.

Along with the formation of SIAP, two other measures designed to assist shipbuilding were announced. One was the financing of shipbuilding exports totaling $475 million by the Export Development Corporation.[50] The other was the development of dry docks on the West coast through the refurbishing of the graving dock at Esquimalt and the construction of a new floating dry dock in the port of Vancouver.[51]

The maximum amount of subsidy under SIAP ranged from 14 to 8 per cent of the approved cost of the ship, depending on the application date, which was determined as follows, according to paragraph 8(1) of SIAP:[52]

(a) 14 per cent of the approved cost of the ship when the application date is before January 1, 1976;

(b) 13 per cent of the approved cost of the ship when the application date is after December 31, 1975 and before January 1, 1977;

(c) 12 per cent of the approved cost of the ship when the application date is after December 31, 1976 and before January 1, 1978;

(d) 11 per cent of the approved cost of the ship when the application date is after December 31, 1977 and before January 1, 1979;

(e) 10 per cent of the approved cost of the ship when the application date is after December 31, 1978 and before January 1, 1980;

(f) 9 per cent of the approved cost of the ship when the application date is after December 31, 1979 and before January 1, 1981; and

(g) 8 per cent of the approved cost of the ship when the application date is after December 31, 1980.

Although in a few instances, progress payments have been reported, the most common procedure was to pay the subsidy only after the completion of the project. This is true for both the output subsidy and the performance improvement grants.

Under the SIAP, the subsidy rate did not vary according to whether the gross tonnage of the vessel was in excess or less than

25,000 gross tons. This again reflected the influence of the CSSRA which, as mentioned earlier, had been critical of such a criterion.

Under the performance improvement grants (PIG) system, a shipbuilder earned a credit equal to a maximum of 3 per cent of the approved cost of vessels which were entitled to the output subsidy under SIAP or which were purchased by the federal government. The credit could be used as a 50 per cent grant for government-approved productivity improvement projects.[53]

The foregoing are some of the main features of SIAP. Others will be discussed in the next chapter. Under SIAP, a total of $480 million (in current dollars) was spent between 1976 and 1986. Of this, $388 million was for new construction, $38 million for conversion, and the remaining $54 million for performance improvement (Table 3-7). In short, 81 per cent of the total amount was spent on new construction and only 11 per cent on performance improvement. Ninety-eight million dollars, representing 20 per cent of the total was allocated to the construction of bulk carriers, and another 16 per cent for drilling units. On a regional basis, Quebec and Ontario both received 27 per cent and British Columbia, 24 per cent (Table 3-8).

The CSSRA was not pleased with the new subsidy program. One reason for that was the proposed reduction in the maximum subsidy rate from 17 per cent under the STAP, to 14 per cent of approved vessel costs under the new program, and the announcement that the subsidy rate would be further reduced to 8 per cent by 1981. Another reason for CSSRA's dissatisfaction was the announcement in December 1975 that as part of the government's anti-inflation austerity program,[54] funds available for the required shipbuilding subsidy payments would be reduced by $15 million (current dollars) in 1976-77. The Association explained that the reduction of subsidy payments had caused a cash flow problem to many shipyards and, as a result, many of them had to borrow at high interest rates. Several demands were presented in a series of CSSRA briefs to the government, of which the most important were the following. One was the restoration of the SIAP production subsidy rate to the 1976 level, and ship conversions also to be made eligible for subsidy payments.[55] A second demand centered around the government's procurement policy. The CSSRA pointed out that government orders, which accounted for 22.5 per cent of total output during 1963-72, had dropped to 7 per cent in 1975. The Association wanted the government to use procurement to promote stability of demand in the industry.[56] For this purpose, it suggested the placing of government orders during periods of low commercial demand and the development of "a reserve shopping list" of government orders for future low demand periods. A third demand involved Canadian shipping. The Association pointed out that the gross tonnage of foreign-built vessels registered in

Canada has increased considerably since 1968. To counter this upward trend, the Association argued in favour of the development of a Canadian deep-sea fleet and the transportation of natural resource and other exports, as well as Arctic exploration and transportation, in Canadian-built ships. The CSSRA attempted to show how the increase in foreign-built vessels in Canada was partly due to a discrepancy in the treatment of domestic and foreign operators under existing export financing arrangements. Whereas a foreign operator was eligible for subsidized construction through SIAP and subsidized financing through the Export Development Corporation, Canadian operators were eligible only for subsidized construction.[57] The Association showed that whereas long-term lease and loan rates for vessels in Canada were in the range of 10 to 11 per cent, the rates in OECD member countries were about 8.5 per cent and the maximum term available under OECD financing was eight years, compared with 10-15 years in Canada.[58] As a result, a Canadian operator was able to shop abroad and obtain subsidized construction and subsidized financing, and on more attractive terms than in Canada. This in turn was detrimental to the growth of shipbuilding in Canada. This problem had been in existence for a long time. To correct the assymetry, the major shipbuilding members of the Organization for Economic Cooperation and Development had worked out several arrangements starting in 1969, placing restrictions on preferential terms offered for the financing of vessels for export. The United States was not a party to the understanding because it felt that any restrictions on subsidies of whatever form could jeopardize its national defence. The OECD understanding was amended in 1970, 1974, and 1975 and was generally adhered to until the world shipbuilding crisis in 1976. It was given a new lease on life when a revised understanding was signed in 1979. The new agreement, which has continued to date, specified a minimum down-payment of 20 per cent and a maximum duration of financing of 8½ years, at an interest rate of 8 per cent.

Besides export subsidies, international cooperation was sought on curbing the use of other forms of subsidies. In 1972, a general agreement was concluded by Japan and the European members of the OECD to remove obstacles to competition in the shipbuilding industry. Once again, the United States was not a signatory. Article 7 of the new agreement, which was renewed in 1976, stated that:

> Participating governments agree not to introduce any new measures of assistance nor to increase existing assistance, whether direct or indirect, specifically to the shipbuilding industry, unless there are unforeseen and imperative reasons for such intervention in a particular case.

At the end of 1975, the OECD prepared a code of conduct in the form of "general guidelines" to assist governments in coping with the problems of the industry. The two problems addressed are the distribution of the limited number of new orders among countries and the longer-term problem of reducing capacity. With regard to the first problem, the volume and breakdown of orders were subject to constant review and an information system was set up to monitor the volume of new orders placed with each member country. As for the other problem, the participating countries agreed that some reduction in capacity was inevitable but no concrete measures were worked out.

Despite the above measures, the CSSRA was not satisfied with the progress achieved to date because of the continued increase in foreign-built vessels and suggested changes to the Canadian tax regulations and the establishment of a loan insurance or guarantee plan whereby the government would guarantee up to 75 per cent of the principal amount of a loan or lease for a Canadian-built, Canadian flag vessel for an eligible operator.[59] But there was no immediate response from the government to these proposals involving the financing of vessels.

The 1976-78 period witnessed a severe recession in the Canadian shipbuilding industry. Real output which had increased at an annual rate of 2.8 per cent during 1973-75 fell by 8.1 per cent per year during 1976-78. Similarly, employment which had increased by 3.9 per acent per year during 1973-75 declined by 6.3 per cent per year during 1976-78. Internationally too, the industry was faced with a recession which actually started earlier than in Canada, during the 1975-78 period, as can be seen from the decline in orders for vessel construction (Table 2-11). In response to the difficulties experienced in the industry, the government introduced several new measures, some of which had previously been suggested by the CSSRA.[60] First, on December 1, 1976, SIAP was extended to include conversions in addition to new construction. Second, on March 31, 1977, the subsidy rate was increased from 12 to 20 per cent for a period of six months from March 1, 1977 to August 31, 1977. But the government offered no explanation for any of these changes. Third, the government also announced the formation of a sector task force to look into the problems of the shipbuilding industry and recommend solutions.

The sector task force on the Canadian shipbuilding and repair industry issued its report in 1978 and its flavour was distinctly protectionist. According to it, "a certain degree of protectionism is considered appropriate to assist the industry at this time, if it is not to be completely vulnerable to unbridled assault from heavily subsidized foreign competition."[61] The text of the report ran to 10 pages, another two pages were devoted to an appendix dealing with skill requirements for shipbuilding and repair and training; the report concluded with a sector profile of the shipbuilding and repair industry which was prepared by ITC.

This sector profile described the main facets of the industry but offered no analysis on why the industry needed assistance and what impact the assistance given to date has had on the industry. Another important point about the task force concerns the composition of its members. Of the 20 persons listed as participants, nine were high-ranking officers from various shipyards, one a naval architect, one from the university, three from the unions, and the remaining six from provincial governments. The task force secretariat was manned by officials from ITC.[62] Thus the Consultative Task Force was heavily dominated by representatives of the shipbuilding industry and by other groups sympathetic to the cause of the shipbuilders.

Given the dominance of the industry interest groups, it is not surprising to find that many of the key task force recommendations conformed to the thinking of the CSSRA. The main recommendations of the sector task force were the following. First, the Canadian coastal trade should be restricted to Canadian-registered vessels. Second, British Commonwealth vessels, which until now have entered Canada duty free, should be subject to a 25 per cent duty. Third, a similar duty should be imposed on used fishing vessels imported into Canada. Fourth, before used vessels are brought into Canada, government should evaluate their impact on the domestic shipbuilding industry. Fifth, all Arctic-class vessels used in natural resource transportation and exploration should be Canadian-built. Sixth, the SIAP production subsidy should be continued at a rate of 20 per cent for a further two years past its current expiry date. Seventh, all government orders should be placed with Canadian shipyards and, because of the current shortage of work at the shipyards, every effort should be made to advance procurement orders. Finally, Canadian content must be maximized on government-owned and government-financed vessels, as well as on Arctic vessels.

In its response made public in 1979, the government agreed with some of the task force recommendations; on others, it indicated that it needed more time for further review. On the production subsidy, government stated that

> the world situation has deteriorated to a point at which a more selective range of measures is required. Also, the construction subsidy, in its present form, has not proven successful in leading to any significant degree of rationalization in Canadian shipyards and as such does not fully address the concern of the task force for a more efficient industry.[63]

Notwithstanding this admission of failure, the government expressed its intention of continuing with the SIAP output subsidy at 20 per cent until December 31, 1979,[64] although by this time the slump had already ended and the industry had made a significant recovery. Both real output and employment during

1979-80 increased at average annual rates of 16.5 and 13.2 per cent, respectively. A similar recovery is also noticeable in the rest of the world (Table 2-11).

The government also agreed with the task force recommendations dealing with the maximization of Canadian content, the tying of procurement policy to the development needs of the shipbuilding industry, and using government orders to maintain stability of demand. The government also agreed that Arctic-class vessels should be Canadian-registered, but only where such vessels were available at internationally competitive prices. No immediate decision was reached on such matters as restricting coasting trade to Canadian-registered vessels, the imposition of duty on Commonwealth vessels, subsidy on fishing vessels, and duty on imported used vessels, etc.

As promised in the government's response mentioned above, the President of the Board of Economic Development Ministers, Robert Andras, announced on February 1, 1979 an extension of the current subsidy rate of 20 per cent until the end of 1979. Mr. Andras also announced a new special economic development package of $173 million for the industry.[65] Part of these funds was to assist the industry to expand dry dock facilities on both coasts, which in turn was expected to boost the ship repair business. The remaining funds were to be used to bring forward procurement orders which would otherwise have been put off until the early 1980s. There was, however, one area in which the government was adamant, namely, the development of a Canadian flag fleet. In a major policy document entitled A Shipping Policy for Canada, released in 1979, the Minister of Transport, Otto Lang, came out strongly against a Canadian deep sea merchant marine fleet which was thought to be uneconomical.[66] This was a setback to the CSSRA and other interest groups like the Canadian Labour Congress, which had been persistent in their demand for the establishment of a domestic marine fleet.

THE 1980s

The recovery experienced during 1979-80 was short-lived because, since 1981, the industry underwent another major recession. Real output fell by 8.15 per cent per year during 1981-85 and employment fell by an even greater amount - 10.46 per cent per year. As mentioned in Chapter 2, new construction, which had declined during 1976-80, experienced a further deterioration; and even repairs, which had performed well until about 1980, also experienced a slowdown (Table 2-7). Every shipbuilding region in Canada was affected by the slowdown (Table 3-3). On the international scene, there was a similar slowdown in shipbuilding activity leading to a decline, even in the absolute level of orders. Except for Japan and South Korea, which managed to increase their shares of new orders, the other major shipbuilding countries experienced a decline (Table 3-9).

Many countries reacted to the continuous decline in demand for ship construction by reducing subsidies to the industry, leading in several instances to their complete elimination. This was due to a realization on their part that subsidies and other forms of government support have not resulted in a significant improvement in the economic performance of the industry. As a group of London-based shipping consultants remarked in their forecast of shipbuilding in the late 1980s:

> During the past...governments have been artificially stimulating new building demand by a series of ad hoc measures whereby domestic shipyards have been able to sell vessels at well below the costs of construction. Very few governments will continue these kinds of policies during the next few years because of the increasing large costs involved ... Though these measures have given a breathing space for countries to rationalize shipbuilding capacity, they have not been sufficient to utilize a significant proportion of shipbuilding capacity and have merely been instrumental in postponing the inevitable, i.e. substantial yard closures.[67]

Australia made the decision to abolish shipbuilding subsidies rather early around 1976-77, when it became evident that the decline in the industry was irreversible and that it would cost the government an enormous amount to keep the industry alive.[68] In the case of Sweden, the government made a decision in 1980 to phase out the industry over a five-year period. In the United States, the basic subsidy, which had been in existence since the early 1900s, was the Construction Differential Subsidy (CDS), which was aimed at offsetting the differential in the cost of vessel construction between the United States and foreign countries. But during the late 1970s, when assistance to the industry increased rapidly, the government initially capped the subsidy at 37 per cent, and then made drastic reductions culminating in the abolition of the subsidy program in 1981. Japan tried to assist the industry to reduce its capacity. A government loan of a billion yen was used to buy up excess capacity and scrap them. But through the sale of scrapped assets and a tax on the price of new vessels, the loan was repaid by the industry itself, without imposing a serious burden on the taxpayer. The scrapping of capacity ran into considerable resistance later on, which led to the reintroduction of some of the subsidies during the early 1980s.

While many of the other countries were encouraging the industry to contract, Canada tended to vacillate and ultimately ended up increasing its assistance through its procurement policy. In 1982, Edward Lumley, the then Minister of Industry, Trade and Commerce and of Regional Economic Expansion presented a background paper on shipbuilding discussing its performance to date, future

prospects, and policy options available to the government. The Minister painted a bleak future for the industry and discussed three options - retention of the subsidy, its elimination, and other incentives in place of direct production subsidies.[69] While no specific arguments were advanced in favour of the retention of the subsidy, it was argued that if this option was chosen, the subsidy rate would have to be considerably increased in view of the difficulties confronting the industry. As for the elimination option, it was pointed out that it would not only save the government millions of dollars on subsidies, but would also enable Canadians to purchase vessels from abroad at lower rates. But the government hedged on the latter issue by arguing that the elimination of the subsidy would cause short-term unemployment and that its long-term advantages were not readily apparent. It was also mentioned that the elimination of subsidies would have an adverse effect on certain activities in which Canada has some capability, such as the construction of small vessels, fishing vessels, and tugs and barges. The background paper argued that the removal of subsidies would not have a significant effect on the construction of large, seaway-size, Great Lakes vessels and other types such as those used in offshore exploration since these vessels would be imported in any case, whether there was a subsidy or not. The other policy initiatives considered included such things as removing the preferential treatment accorded to Commonwealth-built vessels, targeting capital assistance to specific areas such as offshore exploration, and the extension of customs jurisdiction from the 12-mile limit to the outer limits of the Canadian continental shelf so that vessels used in offshore activities would be subject to the tariff and anti-dumping legislation, etc. But no special preference was indicated for any of these measures. Indeed, apart from discussing the various courses of action open to the government, the background paper remained noncommittal. As a result, no attempt was made to terminate the subsidies. The final decision to abolish the subsidy program came in 1985, when it was announced that no subsidies would be paid to vessels scheduled for delivery after June 1985. Although the production subsidy was terminated, the government continued to assist the shipbuilding industry in other ways such as through tariff protection, procurement, and subsidies for modernization in the form of performance improvement grants. Of these, procurement policy was by far the most important.

CONCLUSION

The main conclusions which emerge from the foregoing analysis are the following. First, government subsidization of the shipbuilding industry has had a long history, going back to the 1960s. Second, during the initial stages of government involvement in the industry during the early to mid-1960s, the government tended to be half-hearted because it was not fully convinced of the need for intervention. Third, the CSSRA seems to have been largely responsible for changing the government's mind regarding assistance to the industry. In this context, it is important to mention that even the sector task force and other

committees which were set up from time to time to advise the government were strongly influenced by the CSSRA because of their heavy industry representation. As a result, several of the CSSRA's demands were taken into account in the subsidy programs introduced during the 1961-84 period. Several key features of the SIAP, notably the performance improvement grants and the decision to integrate the domestic and export subsidy schemes and the extension of the subsidy to conversions were in response to the demands of the CSSRA. Fourth, and extremely important, except for the early 1980s when the Lumley background paper appeared, the government did not undertake any serious analysis of the problems of the industry, the need for intervention, and the various policy alternatives. Fifth and finally, whereas during the late 1970s and early 1980s other countries encouraged the shipbuilding industry to contract, there was a great deal of vacillation on the part of the Canadian government. As a result, the much-needed adjustment was delayed. Even after SIAP was abolished in 1985, government assistance has not been terminated. Instead, assistance has continued in other forms including procurement policy, tariffs and performance improvement grants.

Notes

1 Canadian Maritime Commission, Second Report (Ottawa: King's Printer and Controller of Stationery, June 30, 1949), pp. 44-49.

2 Canadian Deep-Sea Shipping Industry - Statement of Government Policy by the Prime Minister, House of Commons Debates, December 9, 1949.

3 This discussion is based on Ocean-Going Shipping and the Canadian Shipbuilding Industry, Report prepared by Woods Gordon and Company Limited to Canadian Shipbuilding and Ship Repairing Association, November 17, 1964, Appendix 1, pp. 1-3.

4 Ibid., pp. 3-4.

5 Ibid., pp. 4-6.

6 Canadian Maritime Commission, Annual Reports, 1950, p. 21, and 1961, p. 30.

7 Ocean-Going Shipping and the Canadian Shipbuilding Industry, op. cit., Appendix 1, Table 1.

8 Based on employment data from Canadian Maritime Commission, Ninth Report, June 28, 1956, p. 19 and Nineteenth Report, June 15, 1966, p. 14; real output data on shipbuilding and manufacturing from Dominion Bureau of Statistics, Indexes of Real Domestic Product by Industry (1961 Base), Catalogue 61-506, occasional, p. 21 and p. 28.

9 Regional employment data taken from the Canadian Maritime Commission, Ninth Report, p. 10, and Nineteenth Report, p. 11.

10 Canadian Shipbuilding and Ship Repairing Association, Brief Submitted to the Royal Commission on Coasting Trade, Ottawa, June 30, 1955, p. 17.

11 Ibid., p. 17.

12 See, for example, Canadian Shipbuilding and Ship Repairing Association, Annual Report, 1959-60, pp. 6-7.

13 Ibid., pp. 6-7.

14 Ocean-Going Shipping and the Canadian Shipbuilding Industry, op. cit., Appendix 1, Table 5.

15 Canadian Shipbuilding and Ship Repairing Association newsletter, Why Build Ships in Canada?, February 1960, p. 1.

16 Appropriation Act No. 4, Ship Construction Assistance Regulations, September 4, 1961, 4(1).

17 Ibid., 4(3).

18 Ibid., 4(2).

19 Appropriation Acts, Ship Construction Assistance Regulations, amended, July 28, 1965.

20 Appropriation Act No. 4, 1961, op. cit., 7(2).

21 Ibid., 9(2)(c).

22 Canadian Shipbuilding and Ship Repairing Association, Annual Report, 1962-63, p. 5.

23 The employment data are from Statistics Canada, The Labour Force (Catalogue 71-001, monthly), November 1985, Table 2, and the real output data are from CANSIM.

24 Canadian Shipbuilding and Ship Repairing Association, Annual Report, 1964-65, p. 5.

25 Report of the Committee on Shipbuilding in Canada, Part II, May 27, 1970, p. 125.

26 Regulations respecting capital subsidies for the construction of commercial and fishing vessels, 6(1) in office consolidation, Canada Ship Construction Subsidy Regulations (Ottawa: Information Canada, 1971), pp. 6-7.

27 Report of the Committee on Shipbuilding in Canada, op. cit., p. 193.

28 Ibid., p. 128.

29 Canadian Shipbuilding and Ship Repairing Association, Annual Report, 1968-69, p. 11.

30 H. J. Darling, Report of Inquiry on the Coasting Trade in Canada and Related Marine Activity, Ottawa, October 1970, p. IV.

31 Alan H. Case, Transportation 1980: The Outlook and Issues for Canadian Transportation in the Next Decade (Ottawa: Department of Finance), December 1969.

32 Report of the Committee on Shipbuilding in Canada, op. cit., p. 36.

33 Ibid., p. 39.

34 Ibid., p. 41.

35 Appropriation Act No. 3, 1970, Shipbuilding Temporary Assistance Program Regulations, P. C. 1970-2198, December 22, 1970, 3(3).

36 Ibid., 3(4)(a) to 3(4)(e).

37 Ibid., 6(1), according to which the maximum rate of subsidy payable to an eligible ship of not more than 25,000 tons gross tonnage was:

(a) 17 per cent of the approved cost when the contract date of the eligible ship was not later than September 30, 1971;
(b) 16¼ per cent when the contract date was between October 1, 1971 and December 31, 1971;
(c) 16 per cent when the contract date was between January 1, 1972 and March 31, 1972; and
(d) 15¼ per cent when the contract date was between April 1, 1972 and June 29, 1972.

38 Ibid., 6(2).

On eligible ships of more than 25,000 tons gross tonnage, the maximum subsidy rate was:

(a) 14 per cent of approved cost when the contract date was not later than September 30, 1971;
(b) 13¼ per cent when the contract date was between October 1, 1971 and December 31, 1971;
(c) 13 per cent when the contract date was between January 1, 1972 and March 31, 1972; and
(d) 12¼ per cent when the contract date was between April 1, 1972 and June 29, 1972.

39 Canadian Shipbuilding and Ship Repairing Association, Brief to the Minister of Industry, Trade and Commerce on Extension of S.T.A.P., March 16, 1973, p. 5.

40 U.S. Department of Commerce, Maritime Administration Office of Policy and Plans, The Maritime Aids of the Six Major Maritime Nations, November 1977, p. I-9. The countries examined are the United Kingdom, Japan, France, Sweden, Norway, and West Germany.

41 Ibid., p. I-10.

42 Canadian Shipbuilding and Ship Repairing Association, Brief to the Minister of Industry, Trade and Commerce, op. cit., pp. 15-18.

43 Ibid., pp. 21-23.

44 Ibid., pp. 24-25.

45 Canadian Shipbuilding and Ship Repairing Association, Brief to the Minister of Industry, Trade and Commerce on Shipbuilding for Export in Canada, August 30, 1974, p. 4.

46 Some of the most vocal among members of Parliament were Mr. J. M. Forrestall (Dartmouth-Halifax East), Mr. Raynald Guay (Lévis), Mr. Donald W. Munro (Esquimalt-Saanich), and Mr. Tom Bell (Saint John-Lancaster).

47 House of Commons Debates, February 2, 1973, p. 194.

48 Appropriation Act No. 3, 1970, Shipbuilding Temporary Assistance Program Regulations, Amendment, P.C. 1973-2137, 17 July 1973, paragraph 2.

49 Canadian Shipbuilding and Ship Repairing Association, Brief to the Minister of Industry, Trade and Commerce, op. cit., p. 6.

50 Industry, Trade and Commerce News Release, Minister's Statement on Shipbuilding Assistance Program, Ottawa, March 5, 1975, p. 5.

51 Ibid., pp. 8-9.

52 Appropriation Act No. 3, 1970, Shipbuilding Industry Assistance Regulations, P.C. 1976-1164, 18 May 1976, paragraph 8(1).

53 Ibid., paragraph 12.

54 Canadian Shipbuilding and Ship Repairing Association, A National Strategy for the Shipbuilding, Ship Repairing and Marine Component Industries, brief presented to the Government of Canada, April 26, 1976, p. 4.

55 Ibid., p. 17.

56 Ibid., p. 8.

57 Canadian Shipbuilding and Ship Repairing Association, A National Strategy for the Shipbuilding, Ship Repairing and

Allied Marine Industries, brief presented to the Government of Canada, May 1977, pp. 20-21.

58 Ibid., p. 21.

59 Canadian Shipbuilding and Ship Repairing Association, A National Strategy for the Shipbuilding, Ship Repairing and Allied Marine Industries, May 1977, op. cit., pp. 21-22.

60 Canadian Shipbuilding and Ship Repairing Association, Annual Report, 1976-77, p. ii.

61 A Report by the Sector Task Force, op. cit., p. 2.

62 Ibid., Appendix 3, pp. 13-14.

63 Response of the federal government to the recommendations of the consultative task force on The Canadian Shipbuilding and Repair Industry, February 1979, p. 3.

64 Ibid., p. 5.

65 Board of Economic Development Ministers, News Release, "Board of Economic Development Ministers announces national development policy for shipbuilding industry," February 1, 1979, p. 2.

66 Transport Canada Marine, A Shipping Policy for Canada, TP-1676 (Ottawa: Minister of Supply and Services Canada, 1979), p. 51.

67 H. P. Drewry (Shipping Consultants) Limited, Prospects for the World Shipbuilding Industry: A Forecast of New Building Requirements to the Late 1980s (London, England: H. P. Drewry Limited, 1979), p. 91.

68 This discussion is based on Marsha Chandler and Michael J. Trebilcock, Adjusting to Trade: A Comparative Perspective, a study prepared for the Economic Council of Canada, 1987, Chapter 4.

69 The Honourable Edward Lumley, Minister of Industry, Trade and Commerce/Regional Economic Expansion, background paper Canada's Shipbuilding Industry Performance, Prospects and Policy Options (The Department, 1982), pp. 50-62.

Table 3-1

Regional Distribution of Ship Construction Subsidies, 1961-76

	1961-1966[1]	1966-1971[2]	1971-1976[3]	Total[4] 1961-76
	(In millions of current dollars)			
British Columbia	31.0	22.1	33.8	86.9
Alberta	-	1.6	1.7	3.3
Manitoba	0.1	0.5	0.3	0.9
Ontario	31.5	23.5	10.9	65.9
Quebec	44.5	39.6	9.7	93.8
New Brunswick	16.4	9.0	6.0	31.4
Nova Scotia	12.2	23.6	11.8	47.6
Newfoundland	0.7	2.2	9.6	12.5
Prince Edward Island	0.6	3.2	0.6	4.4
Total	137.0	125.4	84.3	346.7

1 Subsidies paid under Ship Construction Assistance Regulations (SCAR).
2 Includes payments made under SCAR and Ship Construction Subsidy Regulations (SCSR).
3 Represents payments made under SCSR.
4 Total payments under SCAR and SCSR.

Source Based on data provided by the Department of Regional Industrial Expansion.

Table 3-2

Construction Subsidy Payments, By Type of Vessel, 1961-76

	1961-1966[1]	1966-1971[2]	1971-1976[3]	Total[4] 1961-76
	(In millions of current dollars)			
Barges	13.4	12.7	11.4	37.5
Bulk carriers	48.0	33.8	5.8	87.6
Cargo vessels	9.0	1.7	0	10.7
Deep sea vessels	7.4	0.8	0	8.2
Tankers	9.6	7.3	9.9	26.8
Tugs	7.1	5.5	9.7	22.3
Ferries	17.8	4.9	11.4	34.1
Trawlers	15.0	48.1	23.2	86.3
Other fishing vessels	7.1	0	1.2	8.3
Drilling units	-0	7.1	2.6	9.7
Miscellaneous	2.7	3.5	9.2	15.4
Total	137.0	125.4	84.3	346.7

1 Subsidies paid under Ship Construction Assistance Regulations (SCAR).
2 Includes payments made under SCAP and Ship Construction Subsidy Regulations (SCSR).
3 Represents payments made under SCSR.
4 Total payments under SCAR and SCSR.

Source Based on data provided by the Department of Regional Industrial Expansion.

le 3-3

loyment Growth in CSSRA Member
ds, by Region, 1952-86

	West Coast	Great Lakes	St. Lawrence	East Coast	All member yards
			Average annual growth rates (Per cent)		
-55	5.94	-14.51	6.94	15.67	3.93
-60	3.98	7.04	-2.05	-6.72	-3.80
-65	14.84	4.93	3.62	4.77	5.23
-70	-16.66	-13.71	-10.56	0.61	-9.72
-75	26.37	19.91	14.20	13.83	14.63
-80	2.24	1.81	-7.16	-0.91	-2.53
86	-3.39	-10.07	-7.21	-1.22	-6.68

Employment in CSSRA member yards represents about 93 per cent of total employment in the industry, 1970-86.

e Data for the period 1951-70 was kindly provided by CSSRA on personal request. Data for the subsequent period, 1971-86 from CSSRA, Annual Reports, various issues.

Table 3-4

Regional Allocation of Subsidies under Shipbuilding Temporary Assistance Program, 1971-82

	1971-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	Total
				(In millions of current dollars)					
British Columbia	5.5	2.2	1.0	0.1	0	0	0	0	8.8
Ontario	6.8	2.4	0.5	0	0	0	0	0	9.7
Quebec	29.8	20.7	20.0	15.4	8.0	0.2	0	1.4	95.5
New Brunswick	10.3	6.1	15.2	8.8	7.1	4.9	0	0	[illegible].5
Nova Scotia	8.8	2.3	10.6	3.1	0	0	2.6	0	27.5
Total	61.2	33.7	47.3	27.4	15.1	5.1	2.6	1.4	194.0

Source Based on data from the Department of Regional Industrial Expansion.

Table 3-5

Subsidies Paid under Shipbuilding Temporary Assistance Program, by Type of Vessel, 1971-82

	(In millions of current dollars)
Cargo vessels	67.1
Tankers	90.5
Tugs	2.8
Barges	0.1
Fishing trawlers	0.2
Miscellaneous propelled	5.9
Drilling units	27.4
Total	194.0

Source Based on data from the Department of Regional Industrial Expansion.

Table 3-6

Subsidy Payments under Shipbuilding Temporary Assistance Program, 1971-82

Shipbuilder	Province	Total payments (in millions of current dollars)
Allied Shipbuilding	British Columbia	2.4
Bel-Aire Shipyard	British Columbia	2.9
Burrard Dry Dock	British Columbia	0.7
Canadian Shipbulding	Ontario	4.5
David Shipbuilding	Quebec	31.3
Hawker Industries	Nova Scotia	27.4
International Hydrodynamics	British Columbia	0.5
Marine Industries	Quebec	64.1
Matsu Moto Shipyard	British Columbia	0.2
Port Weller Dry Dock	Ontario	5.2
Saint John Shipbuilding	New Brunswick	52.5
United Tow and Sail	Quebec	0.2
Vancouver Shipyard	British Columbia	0.7
Yarrows Limited	British Columbia	1.4
Total		194.0

Source Based on data from Department of Regional Industrial Expansion.

Table 3-7

Payments Under Shipbuilding Industry Assistance Program, By Type of Vessel, 1976-86

	(In millions of current dollars)
New Construction	
Barges	18.8
Bulk carriers	98.5
Cargo vessels	21.5
Tankers	27.2
Tugs	21.6
Ferries	42.0
Trawlers	18.4
Other fishing vessels	7.5
Drilling units	75.2
Miscellaneous	57.3
Sub-total	388.0
Performance improvement grants	54.2
Total	480.3

Source Based on data from the Department of Regional Industrial Expansion.

Table 3-8

Allocation of Payments under Shipbuilding Industry Assistance Program, by Region, 1976-86

	(In millions of current dollars)
British Columbia	113.0
Ontario	128.1
Quebec	131.2
New Brunswick	65.4
Nova Scotia	13.8
Prince Edward Island	1.2
Newfoundland	26.5
Manitoba	0.5
Northwest Territories	0.6
Total	480.3

Source Department of Regional Industrial Expansion, The Canadian Shipbuilding and Repair Industry Sector Profile, February 8, 1985, Table 1, p. 2.

Table 3-9

Percentage of New Orders Placed, Major Shipbuilding Countries in the World, 1974-85

Period	Japan	South Korea	Western Europe	E.E.C.	Comecon	Rest of the world
			(Average Percentage Shares)			
1974-76	47.89	3.00	28.34	N.A.	N.A.	N.A.
1977-79	48.28	5.19	26.85	14.01	8.76	23.76
1980-82	50.14	8.87	23.65	13.21[a]	6.57	21.21
1983-85	54.18	14.76	N.A.	N.A.	6.46	14.38

N.A. Not available

a Includes Greece, Spain, and Portugal.

Source Lloyd's Register of Shipping, Annual Report, 1983, p. 40, and Annual Report, 1986, p. 43.

4 EVALUATION OF THE SHIPBUILDING INDUSTRY ASSISTANCE PROGRAM

In the previous chapter we described how the shipbuilding subsidy programs have evolved over time and their main features. The present chapter offers a thorough appraisal of the most recent of these programs, the Shipbuilding Industry Assistance Program (SIAP). Our main concern is with the issue of whether SIAP encouraged or discouraged economic adjustment. Economic adjustment refers to the movement of resources from the declining sectors which are characterized by falling demand and low productivity to sectors which are experiencing rising demand and higher productivity. Policies designed to achieve this transfer are referred to as positive adjustment policies. At the other end of the spectrum are policies which encourage the status quo. Thus the question arises as to whether SIAP can be described as a policy designed to promote positive adjustment or the status quo.

It may be argued that SIAP cannot be considered as an adjustment policy because, as mentioned in the preceding chapter, the bulk of assistance was in the form of production subsidies rather than in the form of modernization grants designed to make the industry internationally competitive. However, it should be pointed out that one of the key stated objectives of SIAP was to promote the international competitiveness of the Canadian shipbuilding industry. Moreover, the Department of Regional Industrial Expansion has also recently mentioned[1] SIAP as one of the programs offering adjustment assistance to a specific industry. Thus there seems to be considerable justification for treating SIAP as an adjustment policy and evaluating its impact on economic adjustment.

THE RATIONALE FOR INTERVENTION

The starting point of our investigation is to determine whether there was a need for government intervention. The popular view among economists is that the government should intervene if the market system does not function efficiently. For instance, problems may arise because the technology of production is such as to result in market dominance by a single firm or a few large firms. A market outcome may also be undesirable because benefits are being received, or costs are being borne, by those not involved in the transaction -- a situation involving what are referred to as "externalities." For example, firms are reluctant to provide general training which increases the mobility of workers because they are unable to recover the costs incurred. In the case of capital markets, the difficulties experienced by small businesses is often cited as being due to a market imperfection, although the evidence on this is extremely weak and inconclusive.[2]

We turn next to an examination of the rationale for intervention in the Canadian shipbuilding industry, to see whether the government intervened to correct some market imperfections. In the news release on the formation of SIAP, the then Minister of Industry, Trade and Commerce, Mr. Alastair Gillespie described the objectives of the program in the following manner:

> Its objective was to provide initiatives to assist the industry to improve substantially its internationally competitive position...to maintain stable employment with less reliance on government assistance in the future.[3]

Several rationales for intervention can be discerned in the above news release although they were not explicitly mentioned in that fashion. A point the minister raised in the news release is that the industry is Canadian-owned and controlled. But shipbuilding is not the only industry with a high degree of Canadian ownership. There are others as well. For example, whereas in 1981 Canadian-owned firms accounted for 91.1 per cent of value added in shipbuilding, it was higher in bakeries (93.7 per cent), sash, door and other mill work (96 per cent) and publishing and printing (97.8 per cent). More important, the degree of Canadian ownership is not necessarily an indication of a serious imperfection in the market.

Another important rationale for intervention is that the industry is a major source of employment in certain slow growth communities in Quebec and the Atlantic regions. According to Statistics Canada data, of the 55 shipyards in existence in 1984, 30 were located in Quebec and the Atlantic region and many of these were located in small communities.[4] This has been used by some observers as a basis for advocating increased assistance. For example, a recent report[5] by the Canada Employment and Immigration Advisory Council mentioned Georgetown, Prince Edward Island, as a single industry town which is heavily dependent on the shipyard there. But the shipyard is facing rough times. Hence the report argued that the community can be helped by such measures as locational grants to prospective entrepreneurs, a more flexible use of unemployment insurance to attract new firms, and a more generous mortgage policy to enable workers to build and hold on to their homes. But the existence of single industry communities is not really a reflection of a malfunctioning market system. Some of the variables such as wages and housing

prices in such communities may have already been adjusted by the price mechanism to reflect the risk involved in living in such areas. To the extent that this is true, the provision of such measures as a generous mortgage policy would amount to an overcorrection. One could perhaps use the single industry town case to make an argument for intervention on the grounds that in the absence of subsidies, there would be layoffs which would increase the congestion in local labour markets and raise the search costs of other individuals who are looking for employment. These congestion externalities may provide a valid argument for temporary subsidization of firms.[6] However, there are certain qualifications to this argument which should be mentioned. First, although data are not available to gauge the dependence of local communities on shipyards, it is doubtful that the dependence is high given the small size of the shipyards. Hence any congestion in the labour markets due to plant closure is likely to be small. It should also be noted that the congestion externalities argument is valid only during a period of high and widespread unemployment. But the period immediately prior to the introduction of SIAP can hardly be described as one of high unemployment. On the contrary, the early 1970s saw a steady decline in unemployment in the economy which by 1974 had reached 5.3 per cent -- its lowest level during the decade. Moreover, even if a subsidy is given to existing firms to alleviate the congestion in labour markets, it may attract other firms into the industry, thus producing the opposite effect of aggravating the congestion problem.[7] And lastly, a subsidy based on congestion externalities would have to be of a temporary nature, unlike SIAP which lasted from 1975 to 1985.

Another reason given by the Minister for supporting the industry was that its productivity was improving at the time SIAP was introduced. To demonstrate this, he cited the growth in real value added by worker from $8,900 in 1963 to $11,000 in 1974[8] -- a growth of 23 per cent. On the basis of this, the Minister concluded that the shipbuilding industry was in "a reasonably healthy state."[9] If this is the case, the industry should not be considered for further assistance. Indeed, the evidence shows that productivity in the shipbuilding industry increased at an annual rate of 2.36 per cent during the 1970-74 period, which was a significant improvement over the previous rate of 0.20 per cent for the 1965-69 period.

In 1978, the Department of Industry, Trade and Commerce produced a sector profile of Canadian shipbuilding in which there was a brief discussion of the rationale for continued assistance. The reasons for assisting the industry were mentioned as follows:[10]

- shipyard located in such places as Lauzon and Sorel, in Quebec; Marystown, Newfoundland; Saint John and elsewhere in the Maritimes, are valuable creators of

employment in localities where alternative job opportunities may be lacking;

- as a major trading nation, Canada must have adequate ship repair facilities adjacent to its major ports. It is generally considered advisable for such facilities to also engage in new construction, in order to maintain an adequate pool of skilled tradesmen;

- a domestic shipbuilding industry produces secondary industrial benefits, materials and components in the industry; and

- there is an element of national prestige in having a shipbuilding industry, particularly one with the capability to build warships and vessels for asserting sovereignty in the Arctic.

Of the foregoing reasons, the employment objective has already been discussed. Regarding the second argument advanced in the sector profile concerning the desirability of having repair facilities adjacent to ports, the lack of such facilities is not a reflection of market imperfections. The development of repair facilities depends on whether or not there is a demand for them. Demand in turn depends on such factors as the construction of various types of vessels and the cost of repairs in Canada relative to abroad. A 1984 report prepared by Woods Gordon for the Ontario and federal governments mentioned several reasons for the difficulties faced by Ontario shipyards in obtaining repair work.[11] They include the decline in the number of ocean-going vessels entering the Great Lakes, the tendency for "trampers" (or vessels which do not travel between ports on a regular basis) to get repairs done in developing countries where the costs are lower, the lack of spare parts in Ontario yards, and also their lack of experience in building ocean-going vessels. Under the circumstances, if the government steps in and encourages the development of repair facilities, there is a strong possibility that the facilities would be underutilized. This apparently was the plight of a drydock which was recently built in Halifax for $40 million and much of it coming from the federal purse.[12]

Another argument mentioned in the sector profile why the industry needs assistance is to develop an adequate supply of skilled workers. On this aspect, a survey undertaken by a group of consultants for DREE argued that the lack of skilled manpower is "because of the sporadic Canadian requirement."[13] But it is important to note that many of the skills needed in shipbuilding are highly industry-specific skills and not general types of skills. There is no valid reason why the government should provide training in industry-specific skills.

The argument that shipbuilding industry assistance would have a spillover effect on other industries is also weak. In 1984, the two major suppliers of inputs to this industry were the metals (primary and fabricated) and machinery industry groups. However, as mentioned in Chapter 2, shipments to the shipbuilding industry from these two industries were very small when expressed as a ratio of their total value of shipments. Thus the argument relating to secondary benefits from shipbuilding appears to be exaggerated.

The last rationale mentioned in the sector profile is the national prestige associated with domestic shipbuilding. Being a non-economic argument, this is hard to evaluate. Suffice it to note, however, that as mentioned in Chapter 3, many other countries have either reduced or phased out the shipbuilding industry since the late 1970s. Obviously these countries must have realized that the economic cost of supporting a domestic shipbuilding industry is greater than the national prestige derived from it.

In a news release dated February 1, 1979, the President of the Board of Economic Development Ministers also mentioned several reasons for assisting the industry:

- to maintain a shipbuilding and repair capacity in Canada during the present period of worldwide difficulty;

- to assist the industry to specialize in various areas and to reinforce its technical and innovative capacity; and

- to provide assistance to workers who, despite the efforts of government and industry, may no longer be able to find employment in the shipyards.[14]

While it is true that shipbuilding had suffered a slump, this in itself is not a valid ground for intervention. Such fluctuations in economic activity are to be expected in a well functioning economy and are not indicative of market failure. If the decline in demand is of a relatively long duration, then it would signal the need for significant adjustment in the industry. Assistance in the form of firm subsidies is likely to impede rather than enhance the process of adjustment. If the industry needs to specialize in certain products, it would do so according to the signals from the market. Subsidies would only serve to thwart the market mechanism by providing the wrong signals. The same also applies to innovations where again the decisions taken by the firm would have to be in accordance with certain market indicators such as expected demand. To be sure, there are market imperfections in innovations and the government has a role to play but an output subsidy is not the most efficient way of achieving this goal,

since its main impact is on real output rather than R&D. The latter is encouraged only indirectly through the stimulus provided to output. The more efficient way of achieving an increase in R&D is by employing a policy instrument such as a subsidy program directly geared to R&D. The same comment also applies to assistance to workers who are unable to find alternative employment. Here the more efficient solution is labour market adjustment policies directed at the worker rather than assistance to the firm.

Another argument which has been advanced in favour of intervention particularly by the Canadian Shipbuilding and Ship Repairing Association is based on the presence of foreign subsidies.[15] It is argued that foreign subsidies tend to have an adverse effect on the international competitiveness of the domestic industry and to offset this, subsidies should be provided to domestic producers. There are several difficulties with this argument. First, hardly any empirical evidence has been presented to substantiate the claim that foreign subsidies cause a reduction in international competitiveness of the Canadian shipbuilding industry. We have already mentioned the difficulties in testing this hypothesis. Second, the domestic industry has been and still is heavily subsidized despite its dismal economic performance. Giving additional assistance would only lead to further increases in shipbuilding capacity. Third, if foreign subsidies are a major problem, Canada should try to take remedial action through the GATT along the lines indicated in the GATT code which was mentioned in the previous chapter. Fourth, a subsidy to shipbuilding is essentially an implicit tax on the other industries since it would induce a movement of resources in favour of shipbuilding. Since many of these industries are more efficient than shipbuilding, it is not clear why they should be penalized in this manner.

To sum up this section, the main message of the foregoing discussion is clear and simple: the government does not seem to have carefully considered the rationale for assisting the industry. In our view, the reasons for intervention were not well founded and hence rather shaky.

MEASURING COST EFFECTIVENESS

It is extremely important that before assistance is provided, its cost effectiveness be measured. Since capital markets are believed to function relatively efficiently, the approach taken in some studies[16] has been to focus on the impact of plant closures on labour markets. Essentially, the analysis has been conducted in two stages. In the first, a comparison is made between the present value of social adjustment costs if labour is laid off now with the present value of social adjustment costs when labour is finally laid off. The difference between the two present values is the saving in the adjustment costs of labour arising from the

postponement of layoffs. The adjustment costs mentioned here include such things as a worker's lost wages and benefits, search costs and the psychic cost of unemployment.[17] The second step in the analysis is to compare the cost saving associated with the postponement of layoffs with the social costs that are incurred by assisting the industry and keeping it in operation. These studies argue that if the cost saving of the postponement of layoffs is greater than the costs of keeping the industry going, then the industry should be subsidized.

We have found only one major study which has tried to take into account the social costs of averting layoffs in the Canadian shipbuilding industry. This is a study on Canadian deep sea shipping which was completed by the Department of Finance in 1978. As the title indicates, the main focus of the study was on shipping rather than on shipbuilding. The study considered four options:

1) encouraging vessels registered in foreign countries to enter Canada;[18]

2) Canadian chartering of foreign flag ships;

3) Canadian-owned and operated vessels purchased from the lowest cost sources; and

4) restricting Canadian waters only to Canadian-owned and Canadian-built vessels.

It was in the context of the last option that the study dealt with shipbuilding. Another important point to note is that the study dealt with all types of assistance including tax incentives and direct subsidies, not just with SIAP.

The main conclusion of the study was that options 1 and 2 were preferable to options 3 and 4. The study also found option 4 or a Canadian-owned, operated and built fleet to be the worst option, from an efficiency point of view. When only the private net rate of return on option 4 vessels was considered, it yielded a negative present value of $3.35 million.[19] But when subsidies and tax incentives were eliminated and the economic (pre-tax) return on capital was calculated, it yielded a much greater negative present value of $13.4 million. When account was taken of the fact that wages in shipbuilding were much lower than the opportunity cost of labour, the present value turned out to be a negative $8.1 million. The study also made an adjustment for distortions such as tariffs and subsidies which made the social value of foreign exchange to be higher than its market price. When this adjustment was made, there was a further improvement in the present value but it was still a negative $6.6 million. The main implication of the Department of Finance study is that

assistance to shipbuilding is not cost-effective. Although the study appeared just three years after the establishment of SIAP, it did not lead to any significant change in government policy towards shipbuilding. Nor is there any evidence to show that it encouraged further research on the cost effectiveness of shipbuilding assistance. In short, the evaluation of the cost effectiveness of the program does not seem to have been given much importance.

INCREMENTALITY

The issue of whether a project would have proceeded in the absence of the subsidy is also an important criterion in program evaluation. Incrementality can be discussed at three levels -- firm, industry and the economy. At the level of the firm, incrementality means that the firm would not have undertaken the project if the subsidy was not given. Industry incrementality implies that there would not have been an increase in output or investment in the absence of the subsidy. If one of the firms which did not receive the subsidy would have undertaken the project, it means that the subsidy was not incremental to the industry. At the economy level, a subsidy is incremental only if it contributes to an increase in output or investment over and above what would have occurred without the subsidy. If, as a result of the subsidy there is no increase in output or investment, all it means is that the subsidy has contributed to a substitution of some projects for others without leading to any new investment or output. Theoretically, the best measure of incrementality is the economy-wide measure, followed by industry and firm incrementality. But in terms of the ease of measurement, the order is reversed, with economy-wide incrementality being the most difficult to estimate and firm incrementality the least difficult. But even firm incrementality is quite difficult to measure with any degree of precision. The most common method of obtaining the information to measure firm incrementality is through a questionnaire. But there is no assurance that this method yields reliable information.

Although SIAP was originally conceived of as an industry-specific subsidy in the sense that all firms in the industry were considered for grants, the program administrators had a considerable amount of discretion in such matters as the determination of eligibility and the amount of subsidy to be paid. The eligibility criteria for an output subsidy included the following:

a) evidence that the shipbuilder has, in all respects sufficient resources to complete the ship or ships in respect of which the application is made;

b) evidence that the shipbuilder is able to carry out the construction of the ship without having to overexpand

his facilities in relation to anticipated long-term demand;

c) evidence that the construction of the ship will not have a detrimental effect on the long-term competitive status of the shipbuilder or the Canadian shipbuilding and repair industry;

d) in the case of a ship to be built for a foreign owner, evidence that the construction of the ship will not have a detrimental effect on the continuing availability of facilities to satisfy domestic requirements for ship construction and repair.[20]

SIAP also mentions that:

The shipbuilder shall use Canadian materials, components, equipment and services

i) in the construction of the eligible ship, and

ii) for the improvement of shipyard performance if such materials, components, equipment and services are, in the opinion of the Minister, available and competitive.[21]

None of the criteria has any relevance to incrementality. One could also detect a considerable degree of vagueness in these criteria. For instance, under (c) it is not clear how the construction of a ship could have a detrimental effect on the long-term competitive position of the shipbuilder. As for the industry, its long-term competitive position would worsen if the relatively low productive shipyards are subsidized. The subsidy would also deter the exit of inefficient firms from the industry. But there is nothing in the application to suggest that the program administrators made any attempt to examine the productivity of the shipyards applying for assistance. (A copy of the application form is found in the appendix.) Given the vagueness of the eligibility criteria and their general irrelevance to incrementality, it is not surprising to find that all applicants were accepted.

Regarding the Performance Improvement Grants (PIG), the legislation governing SIAP stated that the applicant should furnish the following documents:

A shipbuilder who applies for the grant of a contribution under these Regulations shall submit to the Minister, in a form acceptable to the Minister, a proposed plan for the improvement of his shipyard including

a) a schedule of all proposed expenditures in respect of the shipyard;

b) a statement of the expected improvement in the shipyard performance resulting from the proposed expenditures referred to in paragraph (a);

c) an audited financial statement for each of the last three fiscal years of the shipbuilder;

d) a projected balance sheet that reflects the implementation of the improvement plan; and

e) a statement of the type of product and level of activity anticipated by the shipbuilder following the implementation of the improvement plan.[22]

On the basis of the above information, the program administrators had to decide who should get the grant and who should not. Unfortunately, the information requested from the applicant did not shed any light on the incrementality of the project. Some of the program administrators we spoke to defended PIG as a good program on the grounds that it provided grants only to the strong firms which are capable of undertaking modernization. But if a firm has the capability to undertake modernization with its own resources, it probably does not need assistance, although there could be some projects which may not be undertaken without the subsidy because their rates of return are too low. If that is the case, a cost-benefit analysis would be helpful in determining which of these projects should be subsidized. But there is no evidence that such analysis was undertaken.

To probe deeper into the issue of the eligibility criteria for giving grants, we looked at the news releases on subsidies awarded to individual shipyards. We found that in some instances the reasons cited for giving subsidies were not related to the eligibility criteria given above. A case in point is a contract worth $121 million awarded in 1983 to Davie Shipbuilding to build a Gulfspan class ferry. The Ministry of State for Economic and Regional Development agreed to contribute $15 million, another $11 million was to be paid under SIAP, and the remainder was to come from CN Marine/Transport Canada. The news release mentioned that:[23]

> The Minister noted that Davie's workforce had demonstrated restraint in adhering to the government's six and five program, which was a condition of the company receiving federal assistance for the contract.
>
> "Because of this demonstration of employee responsibility, the contract will be able to go ahead,

and 1,500 person-years will be created at the yard," he added.

On the basis of the foregoing, it is clear that the SIAP suffered from major weaknesses, the most important of which was its failure to take into account the principle of incrementality. This weakness was recognized by Mr. Edward Lumley, the then Minister of Industry, Trade and Commerce/Regional Economic Expansion in 1982:

> By providing across-the-board assistance, it would appear that subsidy is paid on vessels that would have been constructed in Canada in any event.[24]

So far we have not commented on the Canadian content provision in SIAP. Price information on domestic and foreign parts and machinery is not readily available. Some of the program administrators we spoke to mentioned that they encouraged shipbuilders to buy from Canadian sources so long as the price differential between Canadian and imported parts and equipment did not exceed 10 per cent. We were also told that Canadian content varied according to vessel type. On some vessels such as ferries and fishing vessels Canadian content was relatively high whereas on certain others such as oil rigs it was low because many of the parts and equipment are not available in Canada. The officials we spoke to were hesitant to cite an average estimate of the Canadian content in total purchases of parts and equipment under SIAP. In any event, Canadian content does not affect the previous discussion on incrementality. Instead, its main effect would be to raise the cost of production for shipbuilders, thus making it more difficult for them to become internationally competitive than it otherwise would be. Canadian content would also involve the sharing of the subsidy benefits between the shipbuilders and the Canadian manufacturers of parts and equipment. How much of the benefits was transferred from shipbuilders to parts manufacturers cannot be ascertained due to the lack of data.

MEETING THE OBJECTIVES OF THE PROGRAM

In the preceding sections we examined the rationale for the program, its cost effectiveness and the issue of incrementality. In this section we address the issue of whether SIAP was able to achieve its objectives. At the risk of repetition, the principal objectives are the promotion of the international competitiveness of the industry, the maintenance of stable employment and a gradual reduction in the assistance provided to the industry. A preliminary view based on broad trends in employment and productivity is that these objectives have not been realized. Employment in the industry has declined at a rate of 2.3 per cent per year during 1975-84. Labour productivity growth during the period was 0.3 per cent per year, compared with 1.7 per cent per year for manufacturing. However, to provide a more balanced view

we need to isolate the effect of the subsidy from other factors which influence industry performance.

Let us begin with the production function:

$$Q = f(K, L, M, T) \tag{1}$$

where

Q = gross output, L = labour, K = capital, M = materials (including energy) and T = time trend representing technological change.

Equation (1) can be written in rate of change form as;

$$\dot{Q} = \alpha_1 \dot{K} + \alpha_2 \dot{L} + \alpha_3 \dot{M} + \alpha_4 T \tag{2}$$

where α_1, α_2, and α_3 represent the relative shares of K, L, and M in Q.

Adding the subsidy variable ($\dot{S}$), we get:

$$\dot{Q} = \alpha_1 \dot{K} + \alpha_2 \dot{L} + \alpha_3 \dot{M} + \alpha_4 T + \alpha_5 \dot{S} \tag{3}$$

Dividing both sides of equation (3) by L yields the following labour productivity equation:

$$(\dot{Q}/L) = \alpha_1 (\dot{K}/L) + \alpha_2 (\dot{M}/L) + \alpha_3 (\dot{S}/L) + \alpha_4 T \tag{4}$$

As mentioned in Chapter 3, the bulk of the payments made under SIAP -- about 85 per cent -- consisted of an output subsidy and the rest was accounted for by the Performance Improvement Grants (PIG). Since the output subsidy is essentially a payment to cover the excess of costs over the price of vessels which is exogenously determined in the world market, we have major reservations regarding the validity of including the output subsidy in the productivity equation (4). However, we decided to include it because the promotion of international competitiveness and hence implicitly productivity growth is a major objective of SIAP.

The effect of the subsidy on output and productivity can be assessed by examining the statistical significance of the subsidy variable in (3) and (4) respectively. These are the two equations we fitted.

The magnitude of S is also important. The receipt of a subsidy may either increase the output or leave it unchanged. Consider, for example, two projects, A and B, which a firm is planning to undertake. Only A is eligible for the subsidy. For 2 X dollars

of output in A, the government gives a subsidy of X dollars. If the recipient goes ahead with project A which it would not have undertaken otherwise (an extra marginal project) and its output in B is unchanged, then total output will increase by more than the amount of the subsidy. The coefficient of $S > 1$ (Table 4-1).

If the firm goes ahead with project A but reduces its output in B by 2 X dollars, then total output will increase by the amount of the subsidy. In this case, the coefficient of $S = 1$.

In the third case, the firm produces 2 X dollars of output in project A for X dollars of grants, but reduces its output in B by 3 X dollars. In this case, there is no increase in total production and the coefficient of $S = 0$. Thus, except in the first case, in the other two situations the firm is expanding output in project A but at the expense of project B. As a result of this substitution, it is conceivable that the subsidy may result in no net increase in total output, as we saw in the third case.

There are several problems in fitting equations (3) and (4). One is the lack of data on the relevant variables for individual recipients of subsidies. This means that we have to use the data for the entire shipbuilding industry, which includes both recipients and non-recipients of subsidies. But the bias from this procedure may not be very serious, since the shipyards which received the subsidies accounted for nearly 90 per cent of the employment in the industry in 1984. Another problem concerns the duration of SIAP. If we focus solely on SIAP, we have to confine ourselves to the period 1975-85, which because of the small number of observations would cause a degrees of freedom problem. Consequently, it was decided to take a longer period, 1962-83, which deals with all of the direct subsidy programs mentioned in Chapter 3. They are the Ship Construction Assistance Regulations (SCAR), the Ship Construction Subsidy Regulations (SCSR), the Shipbuilding Temporary Assistance Program (STAP), and SIAP. The choice of 1983 as the cut-off point was due to the lack of data on the price deflators beyond that year. This is discussed later.

Q is the value of shipments deflated by the GDP price deflator for non-auto transportation equipment. The data on value of shipments are from Statistics Canada, Shipbuilding and Boatbuilding (Cat. 42-206) and the GDP price deflator data are from the CANDIDE data bank. Data on L and M are also from the same Statistics Canada publication mentioned above. They were deflated by their respective price deflators. The data on these price deflators relate to non-auto transportation equipment and are from the CANDIDE data bank. The data on price deflators for Q, M, and L are available only up to 1983. The data on real capital stock were supplied by the National Wealth and Capital Stock Section, Statistics Canada upon request. S refers to the annual subsidy payments made to shipbuilders, the data on which was provided by the Marine Industries Division of DRIE. These

subsidy payments were converted into real terms by using the GDP price deflator for non-auto transportation equipment.

The results of the regression analysis are given in Table 4-2. Initial experimentation showed T to be consistently insignificant. Hence T was omitted from the regressions. Both the output and productivity equations were run with and without the constant term. But as can be seen from Table 4-2, it really did not make much difference to the statistical significance of the variables whether the constant term was included or excluded. In the two output equations (3) and (4), K, M and L are significant; but the constant term and the subsidy variable(S) are not. In fact, S has a negative sign. In the productivity equations (5) and (6), (K/L), and (M/L) are significant. But once again, neither the constant term nor the subsidy variable is significant. Like in equations (3) and (4), (S/L) again appears with a negative sign. In all of these equations, the magnitude of S and (S/L) is small and close to zero. Thus our tentative conclusion is that the subsidies have not had a significant impact on either output or productivity in the shipbuilding industry.

The evidence suggests that the subsidy was used to assist some of the inefficient producers in the industry. This evidence comes from plant closures in the shipbuilding industry during the 1980s. Eight of the shipyards which received assistance under SIAP subsequently experienced severe financial problems and closed down their operations (Table 4-3).[25] Two of them - Ferguson and Halifax Industries - have recently reopened under new ownership and with new names. The top eight firms mentioned in Table 4-3 accounted for approximately 20 per cent of the total subsidies paid under SIAP. If we add to this list subsidies paid to Versatile corporation which has been on the brink of bankruptcy for quite a long time,[26] the percentage of SIAP subsidies accounted for by these financially troubled shipyards rises to about a half of the total amount paid. This policy of assisting the financially troubled and presumably the inefficient shipyards is the opposite of what we would expect from a program which is aimed at improving international competitiveness.

As a result of the failure of the program to improve the international competitiveness of the industry, the government ended up increasing assistance instead of reducing it. In 1977, the output subsidy rate was raised from 12 to 20 per cent until January 30, 1979. On February 1, 1979, the 20 per cent rate was extended again until May 31, 1980, after which it was reduced to 9 per cent (see Chart 2-2). Second, on February 1, 1979, the government also announced additional assistance of $173 million as a new special economic development package, the details of which were discussed in chapter 3. Third, there was an increase in tariffs in 1983 to provide protection to the industry, which was discussed in Chapter 2.

PROCUREMENT POLICY

As mentioned in Chapters 2 and 3, procurement policy has played a dominant role in the shipbuilding industry. Given its importance, it is necessary to find out the main objectives of procurement policy and the extent to which they were realized.

Chapter 305 of the Treasury Board's Administrative Policy Manual describes the objective of procurement as the promotion of the economic and social development of Canada.[27] Certain sub-objectives are also identified:[28]

(a) to concentrate initially on industrial benefits, particularly in the electronic and other high technology sectors;

(b) to foster those initiatives that would be competitive in world markets or in the domestic market with normal levels of protection;

(c) to stimulate new product innovation and improvements in production thechnology;

(d) to provide improved opportunity for sub-contracting to Canadian suppliers, particularly small business and suppliers in regions of high unemployment.

Of these, the most important as far as the Canadian shipbuilding industry is concerned is (d). To achieve (d), the government placed considerable emphasis on the socio-economic impact of procurement. In essence, these socio-economic effects dealt mainly with the job creation aspects of procurement.

The Treasury Board Manual is also quite explicit regarding the criteria governing procurement:[29]

(a) the value of the procurement will be in excess of $2 million for goods and services, $10 million for construction projects or (where the socio-economic impact is judged to be significant) of any value;

(b) the procurement action is consistent with Canada's obligations under international agreements such as the GATT Agreement on Government Procurement or the Defence Production Sharing Arrangement with the United States;

(c) the procurement will not be used as a subsidy to support an otherwise unprofitable activity;

(d) when there are extra costs involved in order to achieve a specific benefit it must be demonstrated that:

- the activity generated by the procurement has a clear prospect of becoming commercially viable,
- the socio-economic benefits are sufficient to justify the extra cost of the procurement; and either
- the socio-economic benefits would not be forthcoming in the absence of government assistance, or
- the procurement will contribute to the exploitation of a strategic opportunity.

To ensure that the socio-economic impact of procurement received the utmost consideration, the government set up a two-tier procurement review mechanism consisting of a Procurement Policy Advisory Committee (PPAC) chaired by the Treasury Board Secretariat, and Ad Hoc Procurement Review Committees (PRCs). The role of the PRCs is the identification and pre-planning of the socio-economic aspects of procurement projects. User departments and agencies are required to submit to the PRCs their procurement proposals along with relevant background material. The role of PPAC is to provide socio-economic procurement objectives and to inform the Treasury Board of the reviews of the procurement projects on a case by case basis. On projects of over $ 100 million, the review process is carried out by a special management committee.

The PRCs are required to scrutinize each proposal to determine that certain conditions are met before a recommendation is made to the Treasury Board that the project be undertaken. These conditions are also mentioned in the Treasury Board manual. They relate to incrementality, strategic considerations such as the role the project could play in the development of the firm and of the industrial sector, the future commercial viability of the project, and the cost effectiveness of the project.[30] But it is not clear how much importance was given to economic considerations in the actual awarding of contracts. Some commentators have suggested that non-economic considerations may have played a significant role in some of the contracts given by the government. For example, it has been alleged that when the Saint John Shipyard received the contract to build six patrol frigates in 1983, the federal government tried to pacify the losing province - Quebec - by insisting that the winner build three of the frigates in Quebec shipyards.[31] In the context of the same contract, it has also been sometimes mentioned that the federal government apparently had insisted that the winner, Saint John Shipyard should locate its main systems - engineering centre, Paramax Electronics, in Montreal, whereas Saint John's own preference was to set it up in

Ottawa. Unfortunately, the validity of these and other assertions[32] cannot be checked due to the lack of concrete evidence.

Insofar as non-economic factors played a dominant role in procurement policy, the contract may not have always gone to the lowest bidder. But this hypothesis cannot be tested since information on bid prices is not available. However, to the extent that the lowest bidder did not always emerge the winner, it raises the possibility that procurement may have subsidized the inefficient firms in the industry. The evidence shows that approximately 65 per cent of the funds under procurement was spent on shipyards which have later either closed down or were experiencing grave financial difficulties bordering on bankruptcy (Table 4-4). Thus the evidence suggests that criterion (c) mentioned earlier which states that procurement should not be used to support unprofitable activity has been violated. Criterion (d) has also been violated since procurement policy has been used to support activities which have little or no prospect of becoming commercially viable.

There is some preliminary evidence to suggest that certain projects ran into unanticipated problems after the contract was awarded. For example, the previously mentioned patrol frigate project awarded to the Saint John Shipyard experienced a number of problems including changes in building plans and delays in construction.[33] According to some observers,[34] incidents such as these are partly due to the inherent weaknesses of the fixed price contract system practised in countries like Canada where the payment is the firm's bid. It does not take into account the problem of cost overruns which arises due to the government's inability to know the expected cost of any of the bidders. Neither does the fixed price contract take into account the moral hazard problem which is due to the government's inability to observe the selected firm's efforts to keep its production costs low. Hence costs underruns are not rewarded. Finally, under a fixed price contract, the firm is responsible for all of the risks. On the other hand, if there is risk aversion by the firm, it is in the interests of the government to bear some of the risk of unpredictable cost fluctuations. As a result of these problems, the United States recently has been moving away from fixed price contracts to other forms such as cost-plus and incentive contracts.[35] In a cost-plus contract, the government agrees to cover completely the costs incurred by the contractor, plus a fee that is either fixed in advance or is a proportion of the costs. An incentive contract makes the payment depend both on the bid and on realized costs. If the realized costs exceed the final bid, the firm is responsible for some fraction of the cost overrun. On the other hand, if the firm succeeds in holding its costs below its bid, it is rewarded by being allowed to keep part of the cost underrun. But it is not clear whether the

U.S. experience with alternative contracting systems has been favourable or not.

Canadian procurement policy is required to be consistent with the country's obligations under GATT. The objective of the GATT Agreement on procurement is to provide a set of rules designed to reduce discrimination against foreign suppliers. The exemptions from the GATT Agreement[36] include procurements for Canada's national security or defence, purchases for the departments of Communications, Transport, Fisheries and Oceans, the Prime Minister's Office, and the House of Commons, single or sole source contracts such as those made in an emergency when products could not be obtained in time from other sources or where replacement parts have to be purchased from the original supplier to avoid problems of incompatibility with the equipment which has already been purchased, and procurements made as part of tied aid to developing countries.

The available evidence, although not complete, shows that procurement has been directed mainly to Canadian firms. Indeed, of the contracts we examined there was not a single awarded to a foreign supplier. The maximization of Canadian content is a major objective of procurement policy. The government has tried to increase Canadian content in several ways.[37] One is through closer scrutiny of the subcontracting system. Prime contractors are required to provide such information as the amount of subcontracting undertaken in Canada and the regions as well as the amount of subcontracting offered to small business. Through close monitoring, the government has tried to discourage prime contractors from placing subcontracts offshore. Another method employed by the government is the provision of information on subcontracting to Canadian suppliers. For this purpose, the Department of Supply and Services publishes a weekly bulletin listing contracts of $ 10,000 and more. A third method which has been used in the case of contracts awarded to foreign suppliers is to provide for offsets. Thus, in certain instances, foreign suppliers were required to place some of their subcontracts with Canadian suppliers and/or use Canadian labour. In certain other instances, offsets took the form of reciprocal agreements whereby foreign countries agree to buy from Canadian sources in return for the award of a Canadian contract. This practice of offsets lasted from about 1975 to 1983.[38] Since then, the government has encouraged foreign suppliers to submit their bids through a Canadian partner.[39] This led the New York-based Sperry Corporation to give the prime contract to Saint John shipbuilding in the patrol frigate contract mentioned earlier. Similarly, another consortium led by Pratt and Whitney (a subsidiary of the Connecticut-based United Technologies Corporation) allied with a Canadian firm, Scan Marine, to bid on the same patrol frigate contract.

Despite the government's intention "to guarantee the best deal for Canada,"[40] Canadian content involves a considerable subsidy to the domestic suppliers, the burden of which falls heavily on the Canadian taxpayer. It was shown in Chapter 2 that in the case of some of the bids received during the 1980s, the price of the Canadian bid has exceeded the lowest bid by as much as 77 per cent in certain cases. More recently, some commentators have argued that the per vessel cost of building six Halifax-class ships as part of the current Frigate Building Program is about three times the cost of building the same vessels for the Royal Navy in Britain.[41]

AN ALTERNATIVE STRATEGY

We have already noted that the government responded to the deterioration in the international competitiveness of the industry by continuing assistance. This is in contrast to many other shipbuilding countries which have either downsized or phased out the industry. Canada could have employed a similar strategy by such measures as early retirement of the older workers. According to the 1971 Census of Population, roughly 24 per cent of the labour force in shipbuilding was 55 years and more, compared with only 13 per cent in manufacturing.[42] And according to the 1981 Census,[43] although the proportion of such workers in shipbuilding had declined to 17 per cent, it is still considerably higher than the 12 per cent in manufacturing. It is this group of workers who are relative immobile and hence could be offered early retirement. The younger workers in shipbuilding probably do not have much difficulty in finding alternative employment.[44] A recent Canada Employment and Immigration Commission study attempted to analyse the labour market experience of workers in shipbuilding during the 1974-84 period. Of the 2,263 persons employed in 1974, only about 20 per cent remained in the industry by 1984. Of course, not all of these individuals had worked in the industry on a continuous basis. If we consider only those who had worked in shipbuilding every year from 1974 to 1984, only about 14 per cent were still employed in that industry in 1984. The implication of this finding is that there has been a large number of quits from shipbuilding and presumably, they must have been mainly among the younger workers.

Returning to the older workers or those in the 55 years + age group, we have tried to estimate how much it would have cost the government if instead of subsidies under SIAP, it had given these workers early retirement and provided them with unemployment insurance benefits until the age of 65. The methodology used in the calculations is described in Appendix 2. We found that the early retirement option would have cost the government at most approximately $132 million (1976 $) compared with $253 million (1976 $) paid in subsidies under SIAP. In other words, the government could have saved roughly half of the amount spent in real dollars under SIAP, if it had used the early retirement

option. The other half could have been used for retraining purposes.

CONCLUSION

SIAP was set up in 1975 to stimulate the international competitiveness of the shipbuilding industry and to maintain stable employment. With the attainment of these objectives, the government expected to reduce its assistance to the industry. But exactly the opposite has occurred. Output and employment have contracted and the government has increased its assistance. Even after SIAP was discontinued in 1985, assistance has continued to flow mainly in the form of procurement. Our analysis shows that there was no valid rationale for intervention and that incrementality was largely overlooked. The tentative finding based on our statistical analysis is that direct subsidies have not had a significant impact on either output or productivity. The evidence also shows that some of the subsidy payments under SIAP went to firms which either closed down or were experiencing severe financial problems. A similar observation can also be made with regard to procurement. Assisting firms in this manner leads to the belief that firms could always count on the government for help whenever they are in difficulty. Such an approach impedes rather than induces adjustment. The government could have saved a considerable amount of money if instead of subsidies to firms, it had given the older workers an early retirement option. Our preliminary investigation into this matter shows that the early retirement option would have cost the government in real terms roughly half of what it spent under SIAP.

NOTES

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19 Ibid., p. 88.

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21 Ibid., paragraph 7(f), p. 605.

22 Ibid., paragraph 10(i), pp. 606-607.

23 Government of Canada, "Davie Shipbuilding to be awarded contract to build $121 million ferry," News Release, January 19, 1983.

24 The Honourable Edward Lumley, Minister of Industry, Trade and Commerce/Regional Economic Expansion, Canada's Shipbuilding

Industry Performance, Prospects and Policy Options, Background paper (Ottawa: ITC/DREE, 1982), p. 52.

25 I am deeply indebted to Mr. J. Y. Clarke, President of the Canadian Maritime Industries Association for helpful discussions on this subject.

26 Versatile Corporation appears to be still in the red. It reported losses of $194.6 million and $21.9 million for 1986 and 1987, respectively. On this, see Jennifer Hunter, "Versatile's loss improved to $21.9 million for 1987," Toronto: Globe and Mail, March 2, 1988, p. B-9.

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28 Ibid., p. 6.

29 Ibid., p. 6.

30 Ibid., Appendix D, section 1.2, pp. 24-25.

31 "Air of uncertainty surrounds Ottawa's purchasing policies," Financial Post, December 1, 1986, p. 45.

32 The award of two tribal class destroyers to the Davie Shipyard in Quebec in 1983 is viewed by some as yet another effort to please Quebec for the loss of the patrol frigate contract. On this, see "Destroyer update program sails into political waters," Financial Post, February 8, 1988, p. 47. More recently, another government contract awarded to Versatile Pacific to build an icebreaker has come under close scrutiny form the news media. The icebreaker named Henry Larsen was built at a cost of $97 million some 15 years ago. But because of a malfunctioning electrical drive system, it has not been moved from the dock. It has been learnt that before the tenders were called for the construction of the vessel, a government appointed committee of experts had advised the government to use a diesel mechanical propulsion instead of an electrical propulsion because it is more economical and almost as effective. But for reasons never given, the government apparently overlooked the committee's recommendation and opted for an electrical propulsion system. This discussion is based on "On Ice," a program aired on CBC's Fifth Estate, CBOT, Ottawa, May 9, 1988, Time 8 to 9 p.m.

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Table 4-1

Likely Impact of Grants Program on Output

	Project A			Project B				
	Government's contribution	Firm's contribution	Increase in output	Government's contribution	Firm's contribution	Increase in output	Total increase in output (ΔQ)	Magnitude of S variable (ΔQ/S)
Case 1	x	2x	3x	0	0	0	3x	3 (i.e. $S > 1$)
Case 2	x	2x	3x	0	-2x	-2x	x	S = 1
Case 3	x	2x	3x	0	-3x	-3x	0	S = 0

Table 4-2

Results of Regression Analysis

Equation No.

(3) $$\dot{Q}_t = \underset{(-0.2713)}{-0.1133} + \underset{(10.2449)}{0.2153}\ \dot{K}_t^{**} + \underset{(10.3774)}{0.4690}\ \dot{M}_t^{**} + \underset{(3.7136)}{0.2240}\ \dot{L}_t^{**} \underset{(-0.0467)}{- 0.0001\ \dot{S}_t}$$

$R^{-2} = 0.9918$ D.W. = 1.81

(4) $$\dot{Q}_t = \underset{(10.5506)}{0.2155}\ \dot{K}_t^{**} + \underset{(11.7194)}{0.4637}\ \dot{M}_t^{**} + \underset{(4.6727)}{0.2327}\ \dot{L}_t^{**} - \underset{(-0.1386)}{0.0004}\ \dot{S}_t$$

$R^{-2} = 0.9917$ D.W. = 1.78

(5) $$(\dot{Q}/L)_t = \underset{(0.0139)}{0.0132} + \underset{(5.0855)}{0.2560}\ (\dot{K}/L)_t^{**} + \underset{(3.0394)}{0.2591}\ (\dot{M}/L)_t^{**} - \underset{(-0.0940)}{0.0007}\ (\dot{S}/L)_t^{**}$$

$R^{-2} = 0.8370$ D.W. = 2.19

(6) $$(\dot{Q}/L)_t = \underset{(5.2357)}{0.2560}\ (\dot{K}/L)_t^{**} + \underset{(3.4254)}{0.2596}\ (\dot{M}/L)_t^{**} - \underset{(-0.0965)}{0.0007}\ (\dot{S}/L)_t$$

$R^{-2} = 0.8370$ D.W. = 2.20

Q = Real Output
K = Real Capital
L = Person-Hours
M = Materials and Energy
S = Subsidy in Real Terms

** Indicates significance at 95 per cent confidence interval.

D.W. Durbin-Watson statistic.

t - statistics are given within parentheses.

Table 4-3

Subsidies to Financially Troubled Shipyards, Canada, 1976-85

	Amount Paid (In current dollars)
Bel Aire	12,257,470
Breton Industrial	967,217
Collingwood	97,314,255
Rivtow	6,007,099
Ferguson	8,262,466
Halifax	3,452,669
B.C. Marine	1,301,981
Vancouver	20,268,494
Versatile	190,215,805
Sub-total	340,027,456
Total subsidies paid (1976-85)	678,741,139

Source Government of Canada, Public Accounts, Volume II, (Ottawa: Supply and Services Canada), various issues.

Table 4-4

Procurement Contracts to Financially Troubled Canadian Shipyards, 1977-87

	Payments
	('000 current $)
Bel Aire	27,380
Genstar	18,108
Halifax	91,064
Rivtow	478
Versatile	298,181
Collingwood	52,943
Vickers	99,053
Sub-total	587,207
Total payments made to all shipyards	871,964

Source Based on data made available by the Procurement Division, Department of Supply and Services.

Government of Canada / Gouvernement du Canada

Regional Industrial Expansion / Expansion industrielle régionale

TO: MINISTER OF REGIONAL INDUSTRIAL EXPANSION OTTAWA ONTARIO, K1A 0H5

À: MINISTRE DE L'EXPANSION INDUSTRIELLE RÉGIONALE OTTAWA (ONTARIO) K1A 0H5

APPLICATION UNDER THE SHIPBUILDING INDUSTRY ASSISTANCE REGULATIONS

DEMANDE D'AIDE DANS LE CADRE DU RÈGLEMENT SUR L'AIDE AUX CONSTRUCTEURS DE NAVIRES

Name of shipbuilder/Nom du constructeur de navires

Hereby apply for a grant of a subsidy and contribution in accordance with section 4 of the Shipbuilding Industry Assistance Regulations in respect of:*

a) a ship (or ships) to be built in Canada by the applicant for a person other than the applicant in accordance with the attached copy of a contract dated the _____ day of _____ 19__

b) a ship (or ships) to be built in Canada by and for the applicant in accordance with the attached copy of the plans and specifications.

Demande par les présentes l'octroi d'une subvention et d'une contribution conformément à l'article 4 du Règlement sur l'aide aux constructeurs de navires à l'égard:*

a) d'un navire (ou navires) devant être construit au Canada par le requérant pour une personne autre que le requérant conformément au contrat ci-joint daté du _____ jour de _____ 19__

b) d'un navire (ou navires) devant être construit au Canada par le requérant pour lui-même, conformément à l'exemplaire ci-joint des plans et devis.

*Delete the paragraph that is not applicable.

*Rayer l'alinéa sans objet.

Type of ship to be built Type de navire à construire	Number of ships to be built Nombre de navires à construire	Country of intended registry Pays où le navire sera immatriculé

Contract price of ship or, where the ship is being built by a shipbuilder to be owned by that shipbuilder, the estimated cost of the ship:
Prix contractuel du navire ou, dans les cas où le navire est construit par un constructeur de navires à l'intention de ce constructeur, le coût estimatif de ce navire: $

(Note: If the contract provides for escalation, show both the base price and the ceiling price).
(Note: si le contrat prévoit une échelle mobile des prix, donner le prix de base et le plafond). $

Date(s) hull fabrication to commence:
Date(s) du début de la construction de la coque

Scheduled delivery date(s):
(a copy of the construction schedule should be attached)
Date(s) de livraison prévue:
(joindre une copie de l'échéancier de la construction)

Description of vessel(s) / Description du navire

Length Overall		Longueur hors tout
Breadth		Largeur
Depth		Creux
Draft Loaded		Tirant d'eau charge
Gross Tonnage		Tonnage brut
Deadweight Tonnage		Port en lourd
Displacement Loaded		Déplacement charge
Service Speed		Vitesse en service

Propulsion Machinery / Appareil propulseur

Type		Type
Manufacturer		Fabricant
H.P. & R.P.M.		Puissance et R.P.M.

Has a Performance Improvement Plan been submitted?
Avez-vous présenté un plan d'amélioration du rendement?
(If so, please give date) (Si oui, donner la date)

☐ Yes/Oui

☐ No/Non Date _____

Name/Nom

Title/Titre

Mailing Address/Adresse postale

Date

ITBS-14.3(1-84)

APPENDIX 2

COMPARISON OF THE COST OF EARLY RETIREMENT WITH DIRECT SUBSIDIES

To compare the real cost of early retirement of workers in the 55+ age bracket with the real cost of subsidies, their present values must be calculated.

The present value (PV) of subsidy payments was calculated using the formula

$$(1) \qquad PV = S \left[\frac{(1 + i)^n - 1}{i\,(1 + i)^n} \right]$$

where S = annual subsidy payments in nominal dollars;
i = discount rate for nominal subsidy payments;
and n = number of years.

Date on subsidy payments is from the Marine, Urban and Rail Directorate, DRIE. Between 1976 and 1985, $460 million (current dollars) was spent in subsidies. That is, $51.1 million was spent per year. A real discount rate of 6 per cent was chosen. That is the rate used by Glen Jenkins in his work, "Capital in Canada: Its Social and Private Performance, 1965-1974," Economic Council of Canada Discussion Paper No. 98, October 1977, p. 2. The annual rate of inflation during 1976-85 was approximately 8 per cent, based on Statistics Canada, The Consumer Price Index, Cat. 62-001, Monthly, February, 1988, p. 11. Combining the rate of inflation with the real discount rate yields i equal to 14 per cent per year; the number of years is equal to 9. Inserting this data into equation (1) gives a present value estimate of $253.06 million (1976 $) for the subsidies paid.

To calculate the PV of unemployment insurance benefits, we used the equation

$$(2) \qquad PV = B \left[\frac{(1 + i)^n - (1 + w)^n}{(1 + i)^n \left[(1 + i)\,(1 + w)^{-1} - 1\right]} \right]$$

where i = real discount rate (6 per cent);
w = annual growth rate of U.I. benefits - i.e., 1 per cent per year;
B = annual U.I. benefits;
n = 9 years.

The number of workers in the 55 years and over age bracket in 1976 was assumed to be 2675, which is the figure mentioned in the

1971 census of population. Unemployment insurance benefits per week for 1976 was $133, according to Statistics Canada, Statistical Report on the Operation of the Unemployment Insurance Act, October-December 1979 and Annual Supplement, Cat. 73-001, Quarterly, p. 86. When converted into an annual basis, this becomes $6916 per person per year. Multiplying this by the number of employees 55 years and over - that is, 2675 - gives an estimate of B equal to $18.5 million.

Applying the above data to equation (2) gives a present value of $131.79 million (1976 dollars) for U.I. benefits paid between 1976 and 1985. Comparing the two estimates of present values, it is clear that the government could have saved roughly half of the amount spent in real terms on subsidies, if it had chosen the early retirement option.

5 SUMMARY AND CONCLUSIONS

Chapter 1 described the objective of the study as an assessment of the impact of the Shipbuilding Industry Assistance Program (SIAP) on the performance of the shipbuilding industry during the period 1975 to 1985.

Chapter 2 provided an overview of the shipbuilding industry. The demand for vessel construction had declined since the mid-1970s and this was a world phenomenon. This decline in demand had contributed to a decline in a number of key economic indicators, including real output, employment, productivity, and profits in the Canadian shipbuilding industry, particularly during the 1980s. The Canadian industry has not and still is not internationally competitive. Wages are considerably higher than those paid in other countries like South Korea and Japan. Productivity also seems to lag behind such countries as Japan. These problems have affected many European countries as well. Indeed, it is clear that shipbuilding activity has shifted from Europe to Japan and, more recently, to South Korea and other NICs. Many of the shipbuilding countries reacted to the slump in the industry by initially increasing assistance and then reducing it since the mid to late 1970s. Several of these countries have recently encouraged a reduction in the shipbuilding industry's capacity and a movement of resources out of the industry. By contrast, Canada has continued its assistance to the industry in various forms, including direct subsidies, procurement, tax incentives, and export financing under the Export Development Corporation. After subsidies were terminated in 1985, procurement has become the most important form of assistance to the shipbuilding industry.

Chapter 3 dealt with the evolution of direct subsidy programs in Canadian shipbuilding. The industry has benefitted from two types of direct subsidy programs. One was designed to encourage shipbuilding to meet the needs of the government and the domestic shipowners. This program came into existence in 1961. The other program which started in 1970 was aimed at encouraging the export of vessels. In 1975, these programs were incorporated into a single program - the SIAP. The chapter describes the events leading to the setting up of the subsidy programs. Two conclusions emerge from this historical discussion. One is that there is no published evidence of research undertaken by the government on the need for assistance and on the form the assistance should take, except for a background paper on shipbuilding industry performance, prospects and policy options prepared by ITC/DREE in 1982. Under these circumstances, the government was susceptible to influence from the outside. Specifically, the evidence reveals that the views of the shipbuilding industry were reflected in government policies

created to assist the industry. The chapter also outlined the main features of the SIAP. It included an output subsidy as well as a capital subsidy. The output subsidy was designed to encourage vessel construction, with the federal government contributing 14 per cent to the costs of vessel construction, and the shipbuilder paying for the remaining 86 per cent. The purpose of the capital subsidy was to encourage the modernization of the shipyards. The costs were split on a 50-50 basis between the federal government and the shipbuilder.

Chapter 4 presented an evaluation of the SIAP. On the basis of an examination of imperfections in factor and output markets, it was concluded that there was no valid rationale for the program. Next, it was found that the government had largely ignored the issue of cost effectiveness of the subsidy programs. Even when the results of the only study undertaken on the subject were released, no significant change in government policy emerged. The issue of incrementality was also discussed. Firm incrementality refers to the increase in output/investment which the firm would undertake only if it was given a subsidy. This is the minimum test that must be satisfied to qualify for assistance. However, an examination of the eligibility criteria for the output subsidy showed that many of them were not related to incrementality and a few were incompatible with it. With regard to the capital subsidy, a frequently mentioned argument is that it was paid only to the strong firms in the industry which were capable of undertaking modernization. But if a firm had the resources to undertake improvements on its own, it should not be considered for assistance unless, of course, the rates of return on certain projects were too low for the firm to undertake them without assistance. In that case, a cost-benefit analysis should have been conducted to determine which of these projects should be subsidized. But there is no published evidence to suggest that such analysis was undertaken. The program subsidized all shipyards which applied for assistance. A total of $480 million (current dollars) was spent under SIAP, of which $426 was accounted for by the output subsidy; the remainder represented capital subsidies. The program also had a Canadian content rule according to which the recipients of subsidies were encouraged to buy parts and equipment from domestic sources. The enforcement of this rule must have made it even more difficult than otherwise for the Canadian shipbuilders to become internationally competitive.

SIAP's objectives were to make the industry internationally competitive, stabilize the level of employment, and reduce the need for assistance. But none of these objectives was satisfied. The industry did not become competitive; nor did employment become stable. Assistance to the industry continued to flow unabated. In fact, the output subsidy rate itself was increased several times during the period of SIAP. The statistical analysis we undertook reveals that subsidies had no significant effect on either output or productivity. While these statistical tests may be subject to certain biases and errors due to problems arising from data limitations, the results are in broad agreement with

other evidence such as the evidence from plant closures. The evidence shows that roughly half of the subsidies went to shipyards which either closed down or experienced severe financial problems bordering on bankruptcy.

In recent years, the government has relied heavily on procurement to assist shipbuilding. But the evidence shows that procurement policy has not fared any better than direct subsidies. Although procurement is intended to assist only incremental projects and not ones which are unprofitable, the evidence shows that exactly the opposite has occurred. About 60 per cent of procurement orders has gone to shipyards which have either closed down or been on the verge of bankruptcy. The policy is heavily biased in favour of domestic shipbuilders. In fact, foreign suppliers could apply only through partnership with a domestic producer. However, recent evidence from bids received shows that in certain instances, the Canadian bid has exceeded the lowest bid by as much as 77 per cent.

The central message of this study, then, is simple and straightforward: the Shipbuilding Industry Assistance Program was a failure. The assistance should not have been provided in the first place. There was no rationale for it and the subsidy was not incremental. Instead of giving assistance, the government should have encouraged the industry to contract. In this context, one option for the government would have been to provide early retirement to the older workers. Our analysis shows that if the government had used the early retirement option on workers 55 years of age and over in 1976, it could have saved roughly a half of what it spent under the SIAP in real terms.